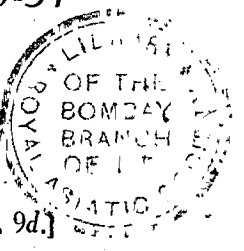
Public Works Department
Bombay Presidency

Irrigation Administration Report

Part II—Sind

For the Year 1930-31



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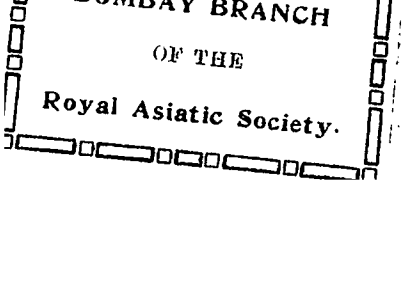

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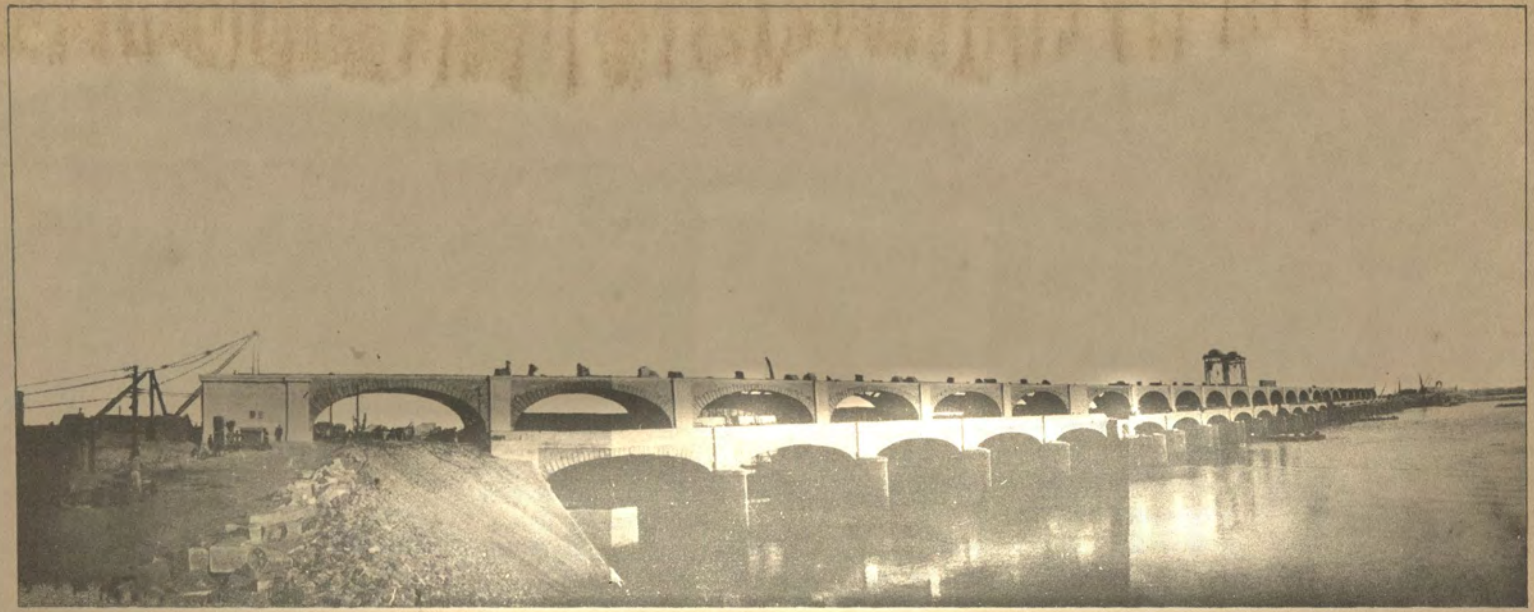

Downstream View of the Barrage taken in October 1930 from the right bank downstream guide bank. Shows the first 23 spans of the high level bridge (Gate Bridge) and low level bridge (Road Bridge) of the Barrage with arches turned.

G. P. Z. P. 1932.

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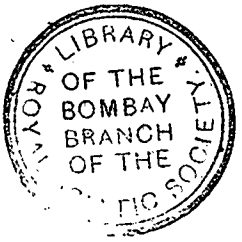

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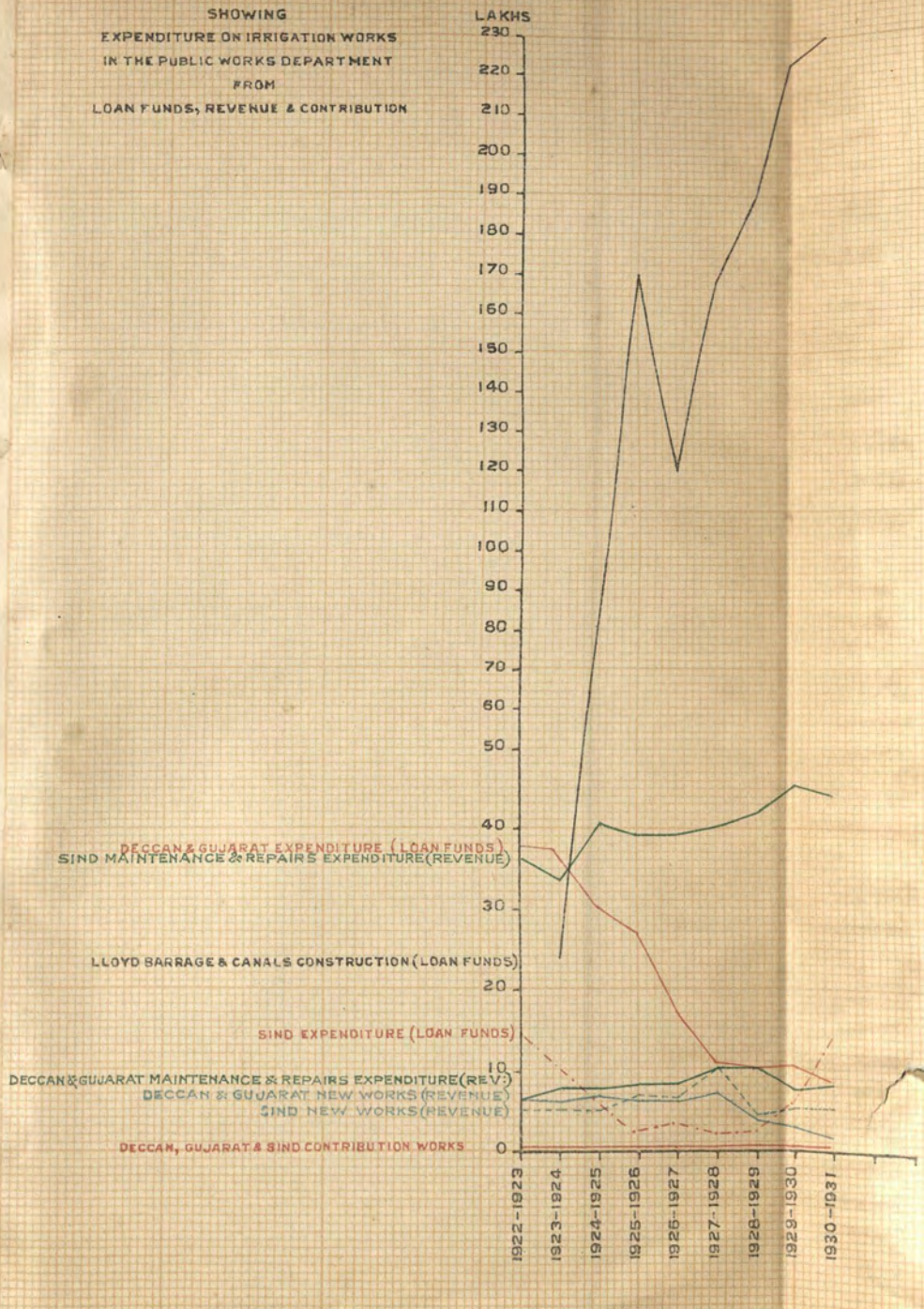
SHOWING
EXPENDITURE ON IRRIGATION WORKS
IN THE PUBLIC WORKS DEPARTMENT
FROM
LOAN FUNDS, REVENUE & CONTRIBUTION



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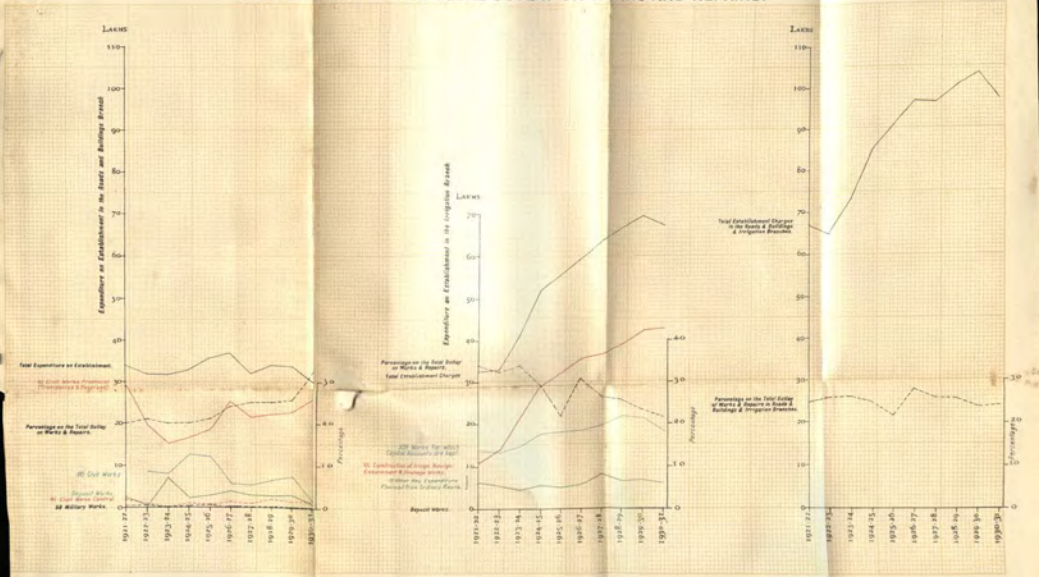
Lakhs
Expenditure on Establishment in the Roads and Buildings Branch
Total Expenditure on Establishment.
Percentage on the Total Outlay on Works & Repairs.
Percentage
Lakhs
Expenditure on Establishment in the Irrigation Branch
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Percentage
Lakhs
Total Establishment Charges in the Roads & Buildings & Irrigation Branches.
Percentage on the Total Outlay on Works & Repairs in Roads & Buildings & Irrigation Branches.
Percentage

Surv. Photozincographic Dept., Poona, 1932.

Statement showing expenditure on establishment in the Roads and Buildings and the Irrigation Branches of the P. W. D. from the year 1921-22 to 1930-31 and percentage on the total outlay on works and repairs during that period in both the Branches

Year	Expenditure on Establishment in the Roads and Buildings Branch						
	41—Civil Works—Provincial (Transferred and Reserved)	60—Civil Works	41—Civil Works—Central	50—Military Works	Deposit Works	Total	Percentage on the total outlay on works and repairs in the Roads and Buildings Branches
1	2	3	4	5	6	7	8
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1921-22 ..	29,06,955	....	1,98,683	45,258	2,84,992	34,35,888	19·26
1922-23 ..	20,14,640	8,34,450	1,78,163	71,481	77,143	31,75,877	20·79
1923-24 ..	15,84,488	8,10,645	67,892	38,560	6,88,354	31,89,939	19·88
1924-25 ..	16,89,892	12,25,632	1,19,721	27,862	2,52,556	33,15,663	19·67
1925-26 ..	18,89,417	12,05,078	1,01,876	69,049	2,58,535	35,23,955	20·66
1926-27 ..	25,30,286	5,97,486	1,68,896	5,882	3,94,389	36,96,939	23·76
1927-28 ..	21,99,448	5,59,107	1,49,132	5,042	2,97,270	32,09,999	24·96
1928-29 ..	22,40,393	6,56,713	2,29,540	2,240	2,56,180	33,85,066	25·03
1929-30 ..	22,45,450	7,33,867	1,56,773	3,638	2,34,897	33,74,625	25·26
1930-31 ..	25,51,711	1,80,139	1,72,163	2,415	85,444	29,91,872	32·35

Year	Expenditure on Establishment in the Irrigation Branch					Percentage on the total outlay on works and repairs in the Irrigation Branch	Total Establishment charges in the Roads and Buildings and Irrigation Branches	Percentage on the total outlay of works and repairs in Roads and Buildings and Irrigation Branches
	55—Construction of Irrigation, Navigation, Embankment and Drainage Works	XIII-Works for which capital accounts are kept	15—Other Revenue Expenditure financed from Ordinary Revenues	Deposit Works	Total establishment charges			
1	9	10	11	12	13	14	15	16
	Rs.	Rs.	Rs.	Rs.	Rs.		Rs.	
1921-22 ..	11,53,734	13,85,960	6,68,651	2,770	32,11,115	33·59	66,47,003	24·26
1922-23 ..	14,20,751	13,44,901	5,34,327	1,993	33,01,972	32·22	64,77,849	25·38
1923-24 ..	21,87,793	14,43,222	4,32,013	2,056	40,65,084	33·89	72,55,023	25·87
1924-25 ..	29,10,785	17,37,724	5,26,361	492	51,75,362	28·73	84,91,025	24·35
1925-26 ..	32,21,647	17,99,343	5,19,228	2,681	55,42,899	21·62	90,66,854	21·23
1926-27 ..	35,56,959	18,08,385	5,94,989	3,207	59,63,540	30·56	96,60,479	27·54
1927-28 ..	36,98,956	19,20,773	7,80,312	3,847	64,03,888	26·00	96,13,887	25·64
1928-29 ..	39,04,670	21,35,939	6,16,601	2,750	66,59,960	25·51	1,00,45,026	25·35
1929-30 ..	42,26,873	21,08,302	6,18,312	1,012	69,54,499	23·26	1,03,29,124	23·88
1930-31 ..	42,88,966	18,31,149	5,99,621	1,734	67,21,470	21·60	97,13,342	24·06

Note.—The percentage of the establishment charges on the cost of works and repairs in the Irrigation Branch (column 14) is generally higher than that in the Roads and Buildings Branch (column 8). The reason is largely that the establishment charges in the Irrigation Branch include the cost of Special Revenue Establishment employed entirely on "revenue management" work on certain canal systems in Sind and the Deccan which has no connection with the execution of works and repairs, and that these charges also include cost of part of the time of Irrigation establishment spent on revenue management including the *control and distribution of water*, which is debited in the accounts to "revenue management" and not to execution of works and repairs. If these establishment charges debited in the accounts to "revenue management" are deducted from the total cost of establishment in the Irrigation Branch the percentage on the cost of works and repairs will not be so divergent. The increase in the rate per cent., in the R. & B. Branch in 1930-31 as compared with that for 1929-30 is mainly due to decrease in outlay on "works" and "repairs". Establishment charges cannot be reduced in the same ratio in which expenditure on works is reduced. A mere overall percentage on expenditure on works is inaccurate. The question of devising a more accurate formula to measure establishment charges is under consideration.

IRRIGATION ADMINISTRATION REPORT
PART II—SIND—1930-31

DESCRIPTION OF IRRIGATION.

1. The Province of Sind is situated beyond the influence of the south-west and the north-east monsoons, and in consequence its rainfall is normally small and unreliable. Unlike the greater part of India, therefore, the area of cultivation in Sind that depends upon rainfall is insignificant. The river Indus, however, brings down abundant supplies of water, the discharge rarely falling below 22,000 cusecs, while the average is as high as 110,000 cusecs. From where it enters the Province of Sind, the river is generally in deltaic formation, flowing along an elevated ridge formed by its own alluvial deposits. The indigenous system of irrigation by inundation canals takes advantage of this physical peculiarity. The device is primitive ; a cut is taken out from the river and after a short distance the canal turns to a course parallel to the river commanding the low-lying lands falling away from the marginal ridge. These old irrigation works have been improved and extended. Scientific methods have been introduced into the design and control of the canals, and many of them have been provided with head regulators. But there are inherent defects in this method of irrigation. The cultivation dependent on river inundations is principally kharif, and even this is subject to insecurity of supply due to fluctuation in the river water levels ; the low water supplies in the winter season can be tapped only to a small extent and largely run to waste in the sea. With the coming into operation of the Lloyd Barrage Canals from the kharif season of 1932 the irrigation system in the greater part of Sind has since been converted from an inundation to a perennial basis. The inundation system is now confined to parts of Upper and Lower Sind outside the sphere of influence of the Barrage.

1. NATURE OF INUNDATION AND RAINFALL.

2. The fair irrigating level of 13 feet on the Bukkur gauge was first reached on the 3rd of July 1930 and this level of 13 feet and over continued till 21st of August, i.e. for 50 days as compared with 49 days in 1929, 11 days in 1928, 21 days in 1927 and 27 days, the average of the last three years. The fair irrigating level of 17 feet on the Kotri gauge was first reached on the 1st of July 1930 and this level and over was maintained for a period of 73 days against 58 days in 1929, 85 days in 1928, 47 days in 1927 and 63 days, the average of the last three years.

3. The highest reading this year on Bukkur gauge was 16·9 on 24th July 1930 as compared with 17·7 in 1929 and the maximum of 17·9 recorded on this gauge in 1897. The highest reading on the Kotri gauge recorded this year was 23·1 feet on 30th July 1930, as compared with 24·1 in 1929, the maximum reading recorded on this gauge.

4. The rainfall during the season was below the average and was not of material benefit to the crops as it fell mostly when the canals were running full.

5. The following table compares the principal features of the inundation with those of the previous years :—

Gauges.	Average of 10 years including 1929.	Average of 3 years including 1929.	1929.	1930.
	Days.	Days.	Days.	Days.
Bukkur gauge 10 feet and over	72	68	60	91
Bukkur gauge 13 feet and over	31	27	49	50
Kotri gauge 14 feet and over	109	110	116	136
Kotri gauge 17 feet and over	70	63	58	73

2. INDUS RIGHT BANK CIRCLE.

A.—GENERAL REVIEW OF THE RESULTS FOR THE YEAR 1930-31.

Area of cultivation, Government, Jagir and Foreign.

6. The gross assessed areas for the year are given in the subjoined statement A.—

Statement A.

Year and class of crops.	55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue A—Irrigation Works.			15-Other Revenue expenditure financed from Ordinary Revenue A-Irrigation Works, Works for which neither Capital nor Revenue accounts are kept.	Grand Total.
	Productive.	Unproductive.	Total.		
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Acres.	Acres.
Average for three years ending 1929-30 — Kharif..	1,222,974	89,001	1,311,975	28,353	1,340,328
Average for three years ending 1929-30 — Rabi ..	292,633	17,386	310,019	30,121	340,140
Average for three years ending 1929-30 — Total ..	1,515,607	106,387	1,621,994	58,474	1,680,468
1929-30 — Kharif..	1,298,579	78,287	1,376,866	31,916	1,408,782
1929-30 — Rabi ..	322,792	24,697	347,489	46,048	393,537
1929-30 — Total ..	1,621,371	102,984	1,724,355	77,964	1,802,319

Statement A—contd.

Year and class of crops.		55-Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue A-Irrigation Works.			15-Other Revenue Expenditure financed from Ordinary Revenue. A-Irrigation Works, Works for which neither Capital nor Revenue accounts are kept.	Grand Total
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Acres.	Acres.	Acres.	Acres.	Acres.
1930-31 ..	Kharif	1,226,592	65,849	1,292,441	27,764	1,320,205
	Rabi ..	378,895	9,552	388,447	43,312	431,759
	Total ..	1,605,487	75,401	1,680,888	71,076	1,751,964
Increase or decrease as compared with the average.	Kharif..	3,618	—23,152	— 19,534	— 589	—20,123
	Rabi ..	86,262	— 7,834	78,428	13,191	91,619
	Total ..	89,880	—30,986	58,894	12,602	71,496
Increase or decrease as compared with the year 1929-30.	Kharif..	—71,987	—12,438	—84,425	—4,152	—88,577
	Rabi ..	56,103	—15,145	40,958	—2,736	38,222
	Total ..	—15,884	—27,583	—43,467	—6,888	—50,355

The total cultivation of the year shows a decrease of 50,355 and an increase of 71,496 acres compared with the figures of the last year and the average of the previous three years, respectively. The area under kharif shows a decrease of 88,577 and 20,123 acres as compared with the areas of last year and with the average of the previous triennium. The area under rabi shows an increase of 38,222 and 91,619 acres in both cases.

7. The area under "Dubari" or twice cropped land which is not included in statement A was 408,345 acres.

The "Dubari" figures for the previous year and the average of the previous three years were 330,894 and 347,085 acres respectively.

8. The net consolidated assessment, including "hakabo" on foreign and jagir lands, after deducting remissions, is given in the subjoined statement B.

Statement B.

Net Consolidated Assessment.

Year and class of Crop.	55—Construction of Irrigation, Navigation, Embankment and Drainage works not charged to Revenue. A—Irrigation Works.			15—Other Revenue expenditure financed from ordinary Revenues A—Irrigation works, Works for which neither Capital nor Revenue accounts are kept.	Grand Total.
	Productive.	Unproductive.	Total.		
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	Rs.
Average of past three years ending 1929-30. Kharif..	40,71,523	2,30,444	43,01,967	74,939	43,76,906
Rabi ..	9,31,323	54,277	9,85,600	62,454	10,48,054
Total ..	50,02,846	2,84,721	52,87,567	1,37,393	54,24,960
1929-30 .. Kharif..	41,67,240	2,04,138	43,71,378	73,758	44,45,136
Rabi ..	10,24,478	74,168	10,98,646	80,758	11,79,404
Total ..	51,91,718	2,78,306	54,70,024	1,54,516	56,24,540
1930-31 .. Kharif..	32,11,813	1,29,552	33,41,365	57,523	33,98,888
Rabi ..	8,02,451	20,346	8,22,797	58,105	8,80,902
Total ..	40,14,264	1,49,898	41,64,162	1,15,628	42,79,790
Increase or decrease as compared with the average. Kharif..	—8,59,710	—1,00,892	— 9,60,602	—17,416	— 9,78,018
Rabi ..	—1,28,872	— 33,931	— 1,62,803	— 4,349	— 1,67,152
Total ..	—9,88,582	—1,34,823	—11,23,405	—21,765	—11,45,170
Increase or decrease as compared with the year 1929-30 Kharif..	—9,55,427	— 74,586	—10,30,013	—16,235	—10,46,248
Rabi ..	—2,22,027	— 53,822	— 2,75,849	—22,653	— 2,98,502
Total ..	—11,77,454	—1,28,408	—13,05,862	—38,888	—13,44,750

The net assessed revenue shows a decrease of Rs. 13,44,750 and Rs. 11,45,170 compared with the figures of last year and the average of the previous three years, respectively.

Cultivation on river spill.

9. The area cultivated on spill water during the year was 139,463 acres, compared with 60,179 acres last year and 39,022 acres, the average of the previous three years.

Assessment rate per acre.

10. The average net consolidated assessment per acre on Government land, compared with that of the previous year and the average of the previous three years, is given below :—

—	Average of previous 3 years.	1930-31.	1929-30.
	Rupees per acre.		
55-Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue.			
1. Productive	3·50	2·63	3·39
2. Unproductive	2·67	1·97	2·69
15-Other Revenue expenditure financed from ordinary Revenues, Works for which neither Capital nor Revenue accounts are kept	2·45	1·75	2·14
Average of all works	3·40	2·56	3·29

Actual realizations under all heads and the balance outstanding.

11. The following statement shows the realizations under all heads and the balance outstanding at the end of the year :—

Statement C.

Years.	Collections.				Balance outstanding.
	Government land and Hakabo.	Miscellaneous.	Four per cent. irrigation share of proceeds for sale of occupancy rights.	Total Receipts.	
1	2	3	4	5	6
Average of past three years.	Rs. 48,62,952	Rs. 88,898	Rs. 78,621	Rs. 50,30,471	Rs. 2,19,970
1929-30	49,96,244	71,179	79,485	51,46,908	2,48,574
1930-31	34,43,905	61,603	80,352	35,85,860	6,92,345
Increase or decrease as compared with 1929-30.	— 15,52,339	— 9,576	867	— 15,61,048	4,43,771
Increase or decrease as compared with the average of three years ..	— 14,19,047	— 27,295	1,731	— 14,44,611	4,72,375

The balance outstanding at the end of the year shows an increase of Rs. 4,43,771 compared with the last year's figure and Rs. 4,72,375 compared with the average figure of the past three years.

Remission on Government land.

12. The remissions on Government land granted during the year amounted to Rs. 18,29,101 compared with Rs. 6,57,822 and Rs. 5,38,215 of the previous year and the average of the previous three years respectively.

Remission on Jagir land.

13. The remissions on jagir land granted during the year amounted to Rs. 1,232 compared with Rs. 10 and Rs. 3 of the previous year and the average of the previous three years respectively.

Remission on foreign land.

14. The remissions on land in Foreign Territory (Kalat) amounted to Rs. 7,355 compared with Rs. 16,649 last year and Rs. 8,470 the average of the previous three years.

The following statement gives details of the causes for remissions, with a comparison of the previous year's figures :—

Causes for remissions.	1929-30.	1930-31.	Difference.
	Rs.	Rs.	Rs.
Deficiency of water	65,273	5,64,716	4,99,443
Breaches in Canals	2,19,982	2,69,647	49,665
Blight or Mahlo	5,212	12,357	7,145
Wire worms or insects	10,863	16,790	5,927
Floods	1,75,831	2,27,765	51,934
Frost	42,946	49,805	6,859
Locust	1,30,642	264	— 1,30,378
Rats	180	5,240	5,060
Revised Settlement	....	878	878
Kalar Soil	11,311	5,135	— 6,176
Other causes	10,243	6,83,335	6,73,092
Erosion	215	188	— 27
Adverse winds	1,514	1,558	44
Fire	269	10	— 259
Hill Torrents	..	....	....
Total ..	6,74,481	18,37,688	11,63,207

Loss to canals in foreign and jagir lands.

15. The loss of canal revenue during the year due to the low rates charged to the jagirdars in Sind and Zamindars in Kalat Territory amounted to Rs. 3,66,047.

16. The total charges during the year on account of maintenance and repairs amounted to Rs. 39,99,615 as under :—

	Rs.
Works	30,01,483
Establishment and Tools and Plant charges ..	7,81,956
Revenue collections	2,16,176
Total ..	39,99,615

The expenditure on establishment charged to works amounted to to Rs. 3,92,941, while the net expenditure on works (clearance and repairs) was Rs. 26,08,542. As compared with last year and the average of the previous three years, the net expenditure on clearance and repairs shows an increase of Rs. 1,28,950 and Rs. 2,77,447 respectively.

Expenditure on Maintenance and Repairs separately for canals and River Embankments.

17. Of the total charges shown in the preceding paragraph, Rs. 27,68,257 were on canals and Rs. 12,31,358 on river embankments.

Outlay on New Works.

18. The outlay of the year on new works was Rs. 6,92,098 as shown below :—

		Rs.
55-Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue—		
Productive	Capital ..	22,721
	Revenue ..	31,360
Unproductive	Capital ..	2,81,927
	Revenue.	..
15-Other Revenue expenditure financed from Ordinary Revenues, Works for which neither Capital nor Revenue accounts are kept ..		3,56,090
Total ..		6,92,098

19. The regular establishment charges in respect of irrigation works amounted to Rs. 7,96,643 compared with Rs. 7,30,961 last year and Rs. 7,02,584 the average of the previous three years.

Regular Establishment charges.

Financial Results.

20. The general financial results of all irrigation works in this Circle are shown in the following statement D :—

Statement D.

Class of works.	Gross Revenue.	Working expenses.	Net Revenue.	Simple interest.	Net profit, 1930-31.	Net profit, 1929-30.	Increase.	Decrease.
1	2	3	4	5	6	7	8	9
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
55-Construction of Irrigation Navigation, Embankment and Drainage works not charged to Revenue								
Productive ..	30,98,719	26,41,807	4,56,912	5,11,589	— 54,677	11,01,667	..	11,56,344
Unproductive ..	1,18,686	1,79,077	— 60,391	60,593	— 1,20,984	—1,19,355	..	1,629
Total ..	32,17,405	28,20,884	3,96,521	5,72,182	— 1,75,661	9,82,312	..	11,57 973

Statement D—contd.

Class of works.	Gross Revenue.	Working expenses.	Net Revenue.	Simple interest.	Net profit, 1930-31.	Net profit, 1929-30.	Increase.	Decrease.
1	2	3	4	5	6	7	8	9
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
15-*Other Revenue expenditure financed from Ordinary Revenues Works for which neither Capital nor Revenue accounts are kept.*	3,64,921	15,87,448	— 12,22,527	..	— 12,22,527	— 8,38,945	..	3,83,582
1930-31 ..	35,82,326	44,08,332	— 8,26,006	5,72,182	— 13,98,188	..		— 15,41,555
1929-30 ..	51,43,472	44,38,437	7,05,035	5,61,668	....	1,43,367		
Increase or Decrease ..	—15,61,146	— 30,105	— 15,31,041	10,514	—15,41,555			— 15,41,555

21. The following statement shows the expenditure per acre of area irrigated under all classes of works, excluding the cost of surveys for definite projects :—

Statement E.

Total area irrigated by all classes of works.	Total working expenses and maintenance canals.	Rate or working expenses per acre of area irrigated (column 2÷1).	Expenditure on agricultural works (excluding cost of surveys for special projects).	Rate of expenditure on agricultural works per acre of area irrigated (column 4÷1).	Total working expenses per acre of area irrigated including expenditure on agricultural works (column 3+5).
1	2	3	4	5	6
Acres.	Rs.	Rs. per acre.	Rs.	Rs. per acre.	Rs. per acre.
1,751,964	28,20,884	1·61	15,87,448	·91	2·52

The total working expenses, including those on agricultural works, amount to Rs. 2·52 per acre of total area irrigated, compared with Rs. 2·46 per acre of area irrigated last year, and Rs. 2·61 per acre of the average area irrigated during the past three years.

22. The mileage of main canals in operation during the year was 1,292 and that of branch canals 2,043 or a total of 3,335 as compared with 3,417 miles last year. The total length of the river embankments maintained was 577 miles compared with 591 miles last year.

Areas of principal crops—Government, Foreign and Jagir.

23. The areas of principal crops grown during the year were :—

Statement F.

Crops.		1930-31. Lift.	1930-31. Flow.	1930-31. Total.	Average of previous 3 years.	1929-30.	Increase or Decrease as compared with average.	Increase or Decrease as compared with 1929-30.
1		2	3	4	5	6	7	8
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Kharif	Rice	25	856,935	856,960	811,709	839,643	+ 45,251	+ 17,317
	Jowari	101,635	218,373	320,008	374,967	383,523	— 54,959	— 63,515
	Bajri	35,196	58,811	94,007	95,105	119,504	— 1,098	— 25,497
	Cotton	165	614	779	1,618	1,504	— 839	— 725
	Other crops	7,769	40,682	48,451	58,959	64,609	— 10,508	— 16,158
	Total	144,790	1,175,415	1,320,205	1,342,358	1,408,783	— 22,153	— 88,578
Rabi	Wheat	32,064	216,713	248,777	195,637	238,080	+ 53,140	+ 10,697
	Barley	155	4,886	5,041	6,864	6,823	— 1,823	— 1,782
	Oilseeds	10,767	161,126	171,893	153,001	178,053	+ 18,892	— 6,160
	Other crops	1,093	413,300	414,393	329,692	301,474	+ 84,701	+ 112,919
	Total	44,079	796,025	840,104	685,194	724,430	+ 154,910	+ 115,674
Grand Total		188,869	1,971,440	2,160,309	2,027,552	2,133,213	+ 132,757	+ 27,096

Compared with the last year and the average of the previous three years there were decreases of 88,578 and 22,153 acres, respectively, under kharif, and increases of 115,674 and 154,910 acres, respectively, under rabi.

Percentage of Kharif.

24. The percentage proportions of kharif and rabi to the total area irrigated were 61 and 39, as compared with 66 and 34 last year. The highest kharif percentage obtained was 91 in the Karachi Canals Division and the lowest 53 in the Begari Canals Division, while in the Shikarpur Canals, Ghar Canals and Western Nara Divisions percentages were 64, 61 and 55.

The Ghar Canals, Karachi Canals and Western Nara Divisions produced as usual the largest rice areas with 253,763, 206,307 and 185,442 acres, respectively, out of the total rice cultivation of 856,960 acres for the Circle.

The largest areas under jowari were obtained in the Begari Canals and Shikarpur Canals Divisions with 140,167 and 88,327 acres, respectively, while the largest area under bajri was, as usual, in the Begari Canals Division, viz. 63,624 acres.

Of the rabi crops, wheat was largely grown in the Begari Canals, Western Nara, Ghar Canals and Shikarpur Canals Divisions. The largest area under oilseeds was as usual in the Begari Canals Division.

Of the total area irrigated during the year 91 per cent. was watered by flow and 9 per cent. by lift.

25. The duties and deltas obtained in this Circle show the usual fluctuations as detailed for each main canal in the following statement :—

Canal.	Year under report.		Last year.		Remarks.
	Duty (Acres per cusec).	Delta feet.	Duty (Acres per cusec).	Delta feet.	
1	2	3	4	5	6
	(i) Begari Canals Division.				
Desert Canal ..	89	3·0	70	3·9	
Unharwah ..	76	4·0	86	3·6	
Begari	105	3·6	103	3·7	
	(ii) Shikarpur Canals Division.				
Mahiwah ..	42	5·0	43	5·7	
Canals in Rohri ..	26	7·3	35	5·6	
Sind Canal ..	65	3·6	43	5·6	
Rajib Canal ..	51	4·0	58	4·2	
Chitti Canal ..	55	3·7	39	5·8	
Garang Canal ..	31	6·6	30	7·2	
	(iii) Ghar Canals Division.				
Sukkur Canal ..	91	3·0	97	4·6	
Ghar Canal ..	50	5·1	76	4·2	
	(iv) Western Nara Division.				
Western Nara including Pritchard.	69	5·0	71	5·3	
Marviwah	60	4·4	49	5·6	
Phitta Canal ..	39	5·6	9	40·6	
Dadu Canal ..	42	6·0	42	5·7	
	(v) Karachi Canals Division.				
Sattah Canal ..	19·4	14·6	20	12·7	
Pinyari Canal ..	49·2	6·3	43	7·9	
Kalri Canal ..	19	14·4	30	8·1	
Baghar Canal ..	12	24·3	9	40·6	Most of the discharge escapes to the sea.

26. On the productive and unproductive works classed under "55-Construction of Irrigation, Navigation, Embankment and Drainage Works," the incidence of working expenses on assessed revenue and per acre irrigated were 72·3 per cent. and 1·68 per acre, respectively, compared with 60·4 per cent. and 1·79 per acre in the previous year.

27. The total value of crops grown on the irrigated area of 2,160,309 acres, as estimated by the Revenue authorities, was Rs. 3,43,37,356, which gives an average value of Rs. 16 per acre.

B.—DETAILS OF DIFFERENT WORKS OR GROUPS OF WORKS AND A COMPARISON OF THE AGRICULTURAL AND FINANCIAL RESULTS OF THE YEAR 1930-31 WITH THOSE OF THE PREVIOUS YEAR AND THE AVERAGE OF THE PREVIOUS TRIENNIUM, AND THE MAIN CAUSES OF ANY IMPORTANT DIFFERENCES IN RESULTS.

(a) Works for which capital accounts are kept.

(I) PRODUCTIVE.

Desert Canal.

28. The new head was opened on the 17th June 1930 for feeding the Adiowah. To allow this head to develop it has been arranged to tail it in into the Desert Dhandh. A length of 1,350′ was eroded away during the abkalani. A silt bar formed in consequence in the first 3 miles which however was completely scoured away later on in the season after the erosion subsided. The bed of this channel has scoured to the extent of about 3 feet. Owing to the unstable conditions at the new head, the old head was used this year to feed the Desert Canal System.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 443 was spent during the year on constructing signallers' quarters and telegraph office at 27th mile, Desert Canal.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 2,54,966, including work establishment.

Irrigation.—The total area irrigated during the year was 210,074 acres, of which 121,504 acres were under kharif and 88,570 acres under rabi, compared with 164,417 acres last year and 203,427 acres the average of the previous three years.

Financial Results.—The gross revenue from all sources amounted to Rs. 2,59,232, compared with Rs. 2,57,282 last year and Rs. 4,11,602 the average of the previous three years. Deducting working expenses, viz. Rs. 3,35,317, the net revenue during the year was *minus* Rs. 76,085.

General Remarks.—The remissions granted during the year amounted to Rs. 1,71,607 compared with Rs. 1,89,204 remitted last year.

The principal crops grown were :—

Rice	44,939	acres.
Jowari	51,136	,,
Bajri	21,637	,,
Wheat	26,640	,,
Oilseeds	16,348	,,

and the value of the whole outturn is estimated at Rs. 31,41,884 or an average of Rs. 15 per acre.

UNHARWAH.

29. This canal worked very satisfactorily. The F. S. L. of 9′ and over was obtained for 74 days continuously. The canal was closed with Bukkur gauge reading 2·2′.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred during the year under this head.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 92,498, including work establishment.

Irrigation.—The total area irrigated during the year was 103,917 acres, of which 52,662 acres were under kharif and 51,255 acres under rabi, compared with 118,022 acres last year and 106,347 acres the average of the previous three years.

Financial Results.—The gross revenue from all sources amounted to Rs. 1,32,570, compared with Rs. 2,35,224 last year and Rs. 2,30,195 the average of the previous three years. Deducting working expenses, viz. Rs. 1,25,563, the net revenue during the year was Rs. 7,007. The decrease in gross revenue this year is due to less area under cultivation and heavy remissions granted.

General Remarks.—The remissions during the year amounted to Rs. 88,154 compared with Rs. 41,249 remitted last year.

The principal crops grown were :—

Rice	11,232	acres.
Jowari	16,600	,,
Bajri	21,056	,,
Wheat	15,361	,,
Oilseeds	6,214	,,

and the value of the whole outturn is estimated at Rs. 11,84,181 or an average of Rs. 11 per acre.

BEGARI CANAL.

30. The canal had an excellent supply throughout the season. The Edan and the Sir Canals, the tail branches of the Begari, were also given an excellent supply by the operation of the gates provided in 1929 at karia heads in miles 31 to 76. The new feeder continued to work satisfactorily. There was side scour along it at the height of the inundation which caused several breaches in its banks. Owing to the breach in the Sukkur Begari Bund, practically the whole area below mile 16 of the Choi Branch was flooded and most of the kharif crops were damaged.

Capital.—An expenditure of Rs. 8,166 was incurred during the year for providing regulating gates to sluices along the Nurwah.

Extensions and Improvements.—A sum of Rs. 2,812 was spent during the year on certain minor works under this head and on a survey in connection with the preparation of projects in the Begari Canals Division.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 2,73,491 including work establishment.

Irrigation.—The total area irrigated during the year was 405,591 acres, of which 208,997 acres were under kharif and 196,594 under rabi, compared with 396,243 acres last year and 342,153 acres the average of the previous three years.

Financial Results.—The gross revenue of the year amounted to Rs. 5,08,368, compared with Rs. 9,33,492 last year and Rs. 8,26,400 the average of the previous three years. Deducting working expenses, viz. Rs. 3,77,624, and the share due to old irrigation, viz. Rs. 24,854, the net revenue due to improvements was Rs. 1,05,890. The decrease in gross revenue this year in spite of the increased area under cultivation is due to the heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 3,75,287 against Rs. 69,893 remitted last year.

The principal crops grown were :—

Rice	.. .. ..	106,561 acres.
Jowari	.. .. ..	71,040 ,,
Bajri	.. .. ..	18,847 ,,
Wheat	.. .. ..	40,762 ,,
Oilseeds	.. .. ..	47,486 ,,

The value of the whole outturn is estimated at Rs. 75,77,004 or an average of Rs. 19 per acre.

Sukkur Canal.

31. The Sukkur Canal has two heads, one for kharif called the Rahuja Head and the other for rabi known as the old head. The new feeder for the Rahuja Head excavated last year worked very satisfactorily and the supply had to be cut off at the Rahuja Regulator throughout the abkalani to avoid breaching of the lower reaches of the canal. Due to floods from the Sukkur Begari Bund breach entering this canal, the Rahuja Regulator had to be kept tightly closed for some time causing the silting of the channel which was cleared to some extent with iron scrapers. The Sukkur Canal was cut at miles 15/3 to 23/6 to pass across the flood water.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 18,455 including works establishment.

Irrigation.—The total area irrigated during the year was 121 806 acres, of which 71,722 acres were under kharif and 50,084 acres under rabi, compared with 123,794 acres irrigated last year and 104,806 acres the average of the previous three years.

Financial Results.—The gross revenue of the year amounted to Rs. 2,12,097, compared with Rs. 3,10,472 last year and Rs. 2,75,853 the average of the previous three years. Deducting working expenses, viz. Rs. 94,774, and the share due to old irrigation, viz. Rs. 71,444, the net revenue due to improvements was Rs. 45,879.

General Remarks.—The remissions during the year amounted to Rs. 90,867 compared with Rs. 9,641 remitted last year.

The principal crops grown were :—

Rice	.. .. ..	47,429 acres.
Jowari	.. .. ..	19,631 ,,
Wheat	.. .. ..	18,691 ,,
Oilseeds	.. .. ..	8,356 ,,

The value of the whole outturn is estimated at Rs. 22,22,426 or an average of Rs. 18 per acre.

Ghar Canal.

32. This canal flowed from 13th April 1930 to 6th October 1930 and carried a very good supply from the Arab Dhoro which worked extremely well. As the canal has no head regulator several cuts had to be made in its left bank, miles 2/5 to 9/4, to escape surplus water and relieve the pressure.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 1,68,996 including works establishment.

Irrigation.—The total area irrigated during the year was 378,917 acres, of which 235,255 acres were under kharif and 143,662 acres under rabi, compared with 358,814 acres last year and 359,726 acres the average of the previous three years.

Financial Results.—The gross revenue of the year amounted to Rs. 7,51,662, compared with Rs. 9,91,789 last year and Rs. 9,94,479 the average of the past 3 years. Deducting working expenses, viz. Rs. 2,52,535, and the share due to old irrigation, viz. Rs. 1,16,671, the net revenue due to improvements was Rs. 3,82,456. The decrease in the gross revenue this year in spite of the increased area under cultivation is due to heavy remissions granted.

General Remarks.—The remissions during the year amounted to Rs. 2,81,000 compared with Rs. 64,366 remitted last year.

The principal crops grown were :—

Rice	.. .. ..	206,334 acres.
Jowari	.. .. ..	23,455 ,,
Wheat	.. .. ..	32,038 ,,
Oilseeds	.. .. ..	29,543 ,,

The value of the whole outturn is estimated at Rs. 60,12,375 or Rs. 16 per acre.

Canals in Rohri.

33. These canals worked satisfactorily.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 6,682 was spent under this head on minor works during the year.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 94,869 including work establishment.

Irrigation.—The total area irrigated during the year was 50,691 acres, of which 41,295 acres were under kharif and 9,396 acres under rabi, compared with 66,893 acres last year and 58,701 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 1,10,654 compared with Rs. 1,61,047 last year and Rs. 1,42,325, the average of the previous three years. Deducting working expenses, viz. Rs. 1;36,419, the net revenue was *minus* Rs. 25,765.

General Remarks.—The remissions during the year amounted to Rs. 34,336 against Rs. 15,551 remitted last year.

The principal crops grown were :—

Rice	.. .. ..	4,104 acres.
Jowari	.. .. ..	29,943 ,,
Bajri	.. .. ..	4,848 ,,
Wheat	.. .. ..	6,260 ,,

The value of the whole out-turn is estimated at Rs. 5,72,658 or an average of Rs. 11 per acre.

Sind Canal.

34. The Sind Canal and its branches suffered severely due to the breach in the Sukkur Begari Bund. The feeding channel also silted up heavily as the Head Regulator had to be kept tightly closed. The damage done has since been repaired. Channel No. 1 (now called Labano Distributary) *ex.* the Sind Canal was remodelled and moduled during the year. A project for remodelling the main canal and its branches is under preparation.

Capital.—A sum of Rs. 9,981 was spent under this head for regrading Channel No. I of the Sind Canal.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 3,34,126 including work establishment.

Irrigation.—The total area irrigated during the year was 101,137 acres, of which 53,086 acres were under kharif, and 48,051 acres under rabi, compared with 87,805 acres irrigated last year and 77,974 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 1,65,866 compared with Rs. 2,72,974 last year and Rs. 2,43,346, the average of the previous three years. Deducting working expenses, viz. Rs. 4,30,622, the net revenue was *minus* Rs. 2,64,756. The decrease in the gross revenue this year in spite of the increased area under cultivation is due to heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 1,71,498 compared with Rs. 34,268 last year.

The principal crops grown were :—

Rice	..	..	26,670	acres.
Jowari	..	..	20,731	,,
Wheat	..	..	14,591	,,
Oilseeds	..	..	9,434	,,

The value of the whole out-turn is estimated at Rs. 13,74,698 or an average of Rs. 14 per acre.

Rajib, Chitti and Garang Canals.

35. These canals had a good supply and worked satisfactorily. The head regulator of the Rajib canal had to be kept closed for a long time as no water was required at the tail of the canal due to floods from the breach in the Sukkur Begari Bund.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 17,969 including work establishment.

Irrigation.—The total area irrigated during the year was 28,220 acres, of which 14,022 acres were under kharif and 14,198 acres under rabi, compared with 25,158 acres irrigated last year and 20,394 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 62,065 compared with Rs. 89,444 last year and Rs. 70,568, the average of the past triennium. The decrease in the gross revenue this year in spite of the increased area under cultivation is due to heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 34,430 against Rs. 5,016 remitted last year.

The principal crops grown were :—

Rice	..	..	6,185	acres.
Jowari	..	..	6,850	,,
Wheat	..	..	4,550	,,
Oilseeds	..	..	3,576	,,

The value of the whole out-turn is estimated at Rs. 6,31,326 or an average of Rs. 22 per acre.

Baghar Canal.

36. With the construction of the Head Regulator in 1927, it is now possible to control the water entering this canal. Until however extensive improvements are made to the canal—a scheme for which has been prepared, it will not be possible to control effectively the distribution of available supplies or to prevent the wasteful escape of a great part of these to the sea. The canal commenced flowing on the 10th of April 1930 and stopped on 9th October 1930. It worked as well as could be expected in the circumstances mentioned.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—Expenditure of Rs. 6,536 was incurred under this head on a survey for the improvement of this system.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 25,000 including works establishment.

Irrigation.—The total area irrigated during the year was 36,548 acres, of which 33,844 acres were under kharif and 2,704 acres under rabi, compared with 37,500 acres last year and 36,757 acres, the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 66,422 compared with Rs. 86,052 last year and Rs. 80,579, the average of the past triennium. Deducting working expenses, viz. Rs. 49,385, the net revenue was Rs. 17,037.

General Remarks.—The remissions granted during the year amounted to Rs 29,178 compared with Rs 6,465 remitted last year.

The principal crops grown were :—

Rice	30,097	acres.
Bajri	2,480	,,
Barley	1,553	,,

The value of the whole out-turn is estimated at Rs. 7,31,633 or an average of Rs. 20 per acre.

Indus Canals Right Bank.

37. *Capital.*—No expenditure was incurred under this head during the year.

Extensions and Improvements.—An expenditure of Rs. 1,749 was incurred under this head on a survey for the improvement of this system.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 11,995 including work establishment.

Irrigation.—The total area irrigated during the year was 26,631 acres, of which 25,259 acres were under kharif and 1,372 acres under rabi, compared with 27,653 acres last year and 28,044 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 37,466, compared with Rs. 52,296 last year and Rs. 54,351, the average of the past three years. Deducting working expenses, viz. Rs. 21,866, the net revenue was Rs. 15,600. The decrease in the gross revenue this year was due to the heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 24,798 compared with 6,433 remitted last year.

The principal crops grown were :—

Rice	22,301	acres.
Bajri	1,112	,,

The value of the whole out-turn is estimated at Rs. 5,17,036 or an average of Rs. 19 per acre.

Pinyari Canal.

38. This canal flowed from 11th May 1930 to 11th October 1930. It worked very satisfactorily. Towads the end of the abkalani, a low " kacha " was formed in the river at its head. A new head has accordingly been excavated to feed this canal. The distribution system of this canal is defective, due mainly to an enormous number of karias without any sluices or regulating arrangements drawing excessive supply. To remedy this, as also to counteract the adverse effect of the possible fall in the water level in the river when the Barrage canals begin to function, it is proposed to remodel and where possible module this canal system for which a project is under preparation.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 5,173 was spent under this head on a survey for the improvement of this system and on certain minor works during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 1,19,996 including work establishment.

Irrigation.—The total area irrigated during the year was 96,820 acres, of which 82,653 acres were under kharif and 14,167 acres under rabi, compared with 97,557 acres last year and 100,155 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 1,85,273 compared with Rs. 2,51,658 last year and Rs. 2,30,833, the average of the last three years. Deducting working expenses, viz. Rs. 1,72,896, the net revenue was Rs. 12,377. The decrease in the gross revenue this year was due to the heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 78,240 compared with Rs. 27,152 remitted last year.

The principal crops grown were :—

Rice	79,587	acres.
Bajri	2,039	,,
Oilseeds	12,565	,,

The value of the whole outturn is estimated at Rs. 29,01,155 or an average of Rs. 30 per acre.

Indus Canals Left Bank.

39. *Capital.*—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canals were maintained in good order at a cost of Rs. 55,671 including work establishment.

Irrigation.—The total area irrigated during the year was 43,229 acres, of which 29,062 acres were under kharif and 14,167 acres under rabi, compared with 39,345 acres irrigated last year and 42,596 acres the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 80,510 compared with Rs. 94,487 last year and Rs. 1,00,703 the average of the past three years. Deducting working expenses, viz. Rs. 76,030, the net revenue was Rs. 4,480. The decrease in the gross revenue this year in spite of the increased area under cultivation was due to heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 98,769 compared with Rs. 16,815 remitted last year.

The principal crops grown were :—

Rice	40,778	acres.
Bajri	1,332	,,

The value of the whole outturn is estimated at Rs. 12,97,435 or an average of Rs. 30 per acre.

Sattah Canal.

40. This canal worked satisfactorily this year. A project for remodelling and moduling this canal has lately been sanctioned.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 11,996 including work establishment.

Irrigation.—The total area irrigated during the year was 17,100 acres, of which 17,036 acres were under kharif and 64 acres under rabi, compared with 15,724 acres irrigated last year and 16,385 acres the average of the past three years.

Financial Results.—The gross revenue amounted to Rs.25,822 compared with Rs. 37,052 last year and Rs. 39,878 the average of the past three years. Deducting working expenses, viz. Rs. 17,854, and the share due to old irrigation, viz. Rs. 6,927, the net revenue due to improvements was 1,041. The decrease in the gross revenue this year in spite of the increased area under cultivation was due to the heavy remissions granted, viz. Rs. 13,827, compared with Rs. 800 remitted last year.

The principal crops grown were :—

Rice	15,204	acres.
Bajri	1,700	,,

The value of the whole outturn is estimated at Rs. 4,34,235 or an average of Rs. 25 per acre.

Western Nara including Pritchard.

41. A combined upstream feeder was excavated this year for the Western Nara and the Fordwah which worked very well though it was submerged for some time during construction due to the sudden rise of the river before the work was wholly completed. There was the usual deficiency of water-supply below mile 61 in the Kakar and Mehar talukas which was met as far as possible by resorting to rotations. The supply at the Baid Regulator was better this year than during the past ten years due to the carrying out of certain minor improvements. A serious breach occurred on 19th July 1930 at mile 0/6 right bank above the Head Regulator which flooded an area of about 67 square miles damaging much of the kharif cultivation. The breach was closed on 23rd August 1930 with much difficulty. The banks have since been raised and strengthened.

The Pritchard Canal commenced flowing on 17th May 1930 and ceased to flow on 7th September 1930. There was erosion at its head resulting in much debris entering the canal. A length of 3 furlongs was eroded during the abkalani. The canal was subjected to heavy pressure in the end of July 1930 when the floods through the Magsi Bund overtopped the left bank and caused a breach in the right bank at mile 3/0. The breach was closed expeditiously and the right bank lower down was raised to save kharif cultivation.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 145 was incurred under this head.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 3,56,052 including work establishment.

Irrigation.—The total area irrigated during the year was 354,452 acres, of which 209,783 acres were under kharif and 144,669 acres under rabi, compared with 348,283 acres last year and 340,459 acres the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 7,02,432 compared with Rs. 9,02,819 last year and Rs. 9,07,029 the average of the past three years. Deducting working expenses, viz. Rs. 4,90,202, the net revenue was Rs. 2,12,230. The decrease in the gross revenue this year in spite of the increased area under cultivation was due to heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 3,24,093 compared with Rs. 1,31,233 remitted last year.

The principal crops grown were :—

Rice	..	..	170,475	acres.
Jowari	..	..	35,623	,,
Wheat	..	..	48,072	,,
Oilseeds	..	..	26,079	,,

The value of the whole outturn is estimated at Rs. 37,15,256 or an average of Rs. 10 per acre.

Phitta Canal.

42. This canal takes off from a by-river. It worked satisfactorily. A stop bund with an armco pipe opening was put across it below the tail of the Mohamedali wah to augment supply in the latter. This stop bund was however carried away during the abkalani.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal was maintained in good order at a cost of Rs. 3,201 including work establishment.

Irrigation.—The total area irrigated during the year was 6,210 acres, of which 3,436 acres were under kharif and 2,774 acres under rabi, compared with 7,726 acres last year and 6,086 acres the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 13,344 compared with Rs. 16,443 last year and Rs. 13,827 the average of the previous three years. Deducting working expenses, viz. Rs. 4,735, the net revenue was Rs. 8,609.

General Remarks.—The remissions granted during the year amounted to Rs. 2,440 compared with Rs. 1,203 remitted last year.

The principal crops grown were :—

Jowari	..	..	..	3,409	acres.
Wheat	..	..	..	1,884	,,

The value of the whole outturn is estimated at Rs. 25,443 or an average of Rs. 4 per acre.

MARVIWAH.

43. This canal derives its supply from a by-river and in consequence it carries very little silt. It was breached at several places by the Magsi Bund floods and all the kharif cultivation except in the 3 miles below the Head Regulator was submerged.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 4,986 including work establishment.

Irrigation.—The total area irrigated during the year was 8,768 acres, of which 4,657 acres were under kharif and 4,111 acres under rabi, compared with 7,339 acres irrigated last year and 6,788 acres the average of the previous three years.

Financial Results.—The gross revenue amounted to Rs. 17,497 compared with Rs. 17,943 last year and Rs. 18,082 the average of the previous three years. Deducting working expenses, viz. Rs. 7,286, the net revenue was Rs. 10,211. The decrease in the gross revenue during this year in spite of the increased area under cultivation was due to the heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 7,529 compared with Rs. 2,945 remitted last year.

The principal crops grown were :—

Rice	..	..	..	3,600	acres.
Jowari	..	..	..	1,040	,,
Wheat	..	..	..	816	,,
Oilseeds	..	..	..	1,651	,,

The value of the whole outturn is estimated at Rs. 44,853 or an average of Rs. 5 per acre.

DADU CANALS.

44. *Capital.*—No expenditure was incurred under this head during the year.

Extensions and Improvements.—A sum of Rs. 13 was incurred under this head.

Maintenance and Repairs.—The canals with their branches were maintained in good order at a cost of Rs. 15,880 including work establishment.

Irrigation.—The total area irrigated during the year was 15,114 acres, of which 9,040 acres were under kharif and 6,074 acres under rabi, against 12,757 acres irrigated last year and 12,076 acres, the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 21,370 compared with Rs. 34,130 last year and Rs. 30,909 the average of the previous three years. Deducting working expenses, viz. Rs. 21,284, the net revenue was Rs. 86. The decrease in the gross revenue during this year inspite of the increased area under cultivation was due to the heavy remissions granted.

General Remarks.—The remissions granted during the year amounted to Rs. 18,300 compared with Rs. 371 remitted last year.

The principal crops grown were :—

Rice	..	..	..	5,500	acres.
Jowari	..	..	..	3,502	,,
Wheat	..	..	..	1,658	,,
Oilseeds	..	..	..	1,102	,,

The value of the whole outturn is estimated at Rs. 80,962 or an average of Rs. 5 per acre.

(2) UNPRODUCTIVE.

MAHIWAH.

45. The mouth of the Gudu Dhandh, the feeder to the Mahiwah system, silted badly this year due to erosion of the river with the result that the canal flowed for 105 days only as compared with 188 days in 1929 and 145 days in 1928. The cultivation suffered to some extent for want of one watering.

Capital.—No expenditure was incurred under this head during the year.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal with its branches was maintained in good order at a cost of Rs. 15,880 including work establishment.

Irrigation.—The total area irrigated during the year was 67,154 acres, of which 53,600 acres were under kharif and 13,554 acres under rabi, compared with 95,375 acres last year and 80,450 acres the average of the past three years,

Financial Results.—The gross revenue amounted to Rs. 95,331 compared with Rs. 2,12,506 last year and Rs. 1,79,151 the average of the previous three years. Deducting working expenses, viz. Rs. 1,38,787 and the share due to old irrigation, viz. Rs. 89,217, the net revenue was *minus* Rs. 1,32,673.

General Remarks.—The remissions granted during the year amounted to Rs. 61,902 compared with Rs. 18,598 remitted last year.

The principal crops grown were :—

Rice	..	..	..	9,978	acres.
Jowari	..	..	..	30,272	,,
Bajri	..	..	..	10,464	,,
Wheat	..	..	..	7,215	,,

The value of the whole outturn is estimated at Rs. 5,85,340 or an average of Rs. 9 per acre.

Kalri Canal.

46. The canal worked satisfactorily and flowed for 138 days from 18th May to 2nd October.

To bring the unoccupied area along this canal system under cultivation and to safeguard it against possible adverse effects due to withdrawals of the Barrage canals, the whole system is being remodelled and the work which was commenced in April 1930 is expected to be completed before the abkalani of 1932.

Capital.—A sum of Rs. 2,25,219 was incurred under this head during the year on remodelling the Kalri and Narichach canals.

Extensions and Improvements.—No expenditure was incurred under this head during the year.

Maintenance and Repairs.—The canal and its branches were maintained in good order at a cost of Rs. 29,993 including work establishment.

Irrigation.—The total area irrigated during the year was 12,767 acres, of which 12,249 acres were under kharif and 518 acres under rabi, compared with 17,088 acres last year and 17,650 acres the average of the past three years.

Financial Results.—The gross revenue amounted to Rs. 23,355 compared with Rs. 45,626 last year and Rs. 39,955 the average of the past three years. Deducting working expenses, viz. Rs. 40,290, the net revenue was minus Rs. 16,935.

General Remarks.—The remissions granted during the year amounted to Rs. 72,200 compared with Rs. 5,343 remitted last year.

The principal crops grown were :—

Rice	..	..	..	9,410	acres.
Bajri	..	..	..	1,804	,,

The value of the whole outturn is estimated at Rs. 2,41,640 or an average of Rs. 19 per acre.

(b) Works for which Capital Accounts are not kept.

Canals.

47. The following canals which were formerly classed under " 15-Works for which only Revenue Accounts are kept " have been reclassified under the head " 15-Works for which neither Capital nor Revenue accounts are kept" :—

(1) New Feeder to Western Nara.
(2) Aral.
(3) Manchur.
(4) Wahurwah.
(5) Canals north of Kotri.

River Bunds.

48. The principal river bunds are the Kashmore Bund, the Sukkur Begari Bund, the Ghar and the Western Nara Bunds, Bunds north of Kotri, the Right and Left Bank Bunds in the Karachi Canals Division and Bunds in the Rohri Division of the Shikarpur Canals Division.

In the Begari Canals Division, except for a small breach in the Tori Bund, which did no damage as it has a loop bund behind it, the bund line was held in tact. The banks of the Begari Feeder were cut to relieve pressure on the Gouspur Loop due to the breach in the Tori Bund.

In the Shikarpur Canals Division, the Sukkur Begari Bund was eroded at mile 27 on the 20th of July 1930. Consequently there was a sudden rush of water against the Satabani Loop and the bund along the Sind Feeder behind the eroded front bund. The Satabani Loop gave some trouble but was successfully held. The Sind Feeder Bund however gave way with the result that the flood rushed against the Adartakio Loop and breached it at several places on the night of the 21st July and flooded a considerable area in the Sukkur and Larkana Districts. The breaches have been closed and the Adartakio Loop and the Sind Feeder Bund have been raised and strengthened. The other bunds in the Division stood well.

In the Ghar Canals Division, nothing untoward happened. The bunds stood very well. The Saidabad Jhalli Bund was cut at miles 17/1, 17/2, 23/2 and 23/3 to drain off the flood water from the Sukkur Begari Bund breach back into the river.

In the Western Nara Division, the Western Nara Bund breached this year at mile 54/4. It was successfully closed. Due to the right bank of the Wahurwah breaching this year, there was much pressure against the Magsi Bund in miles 42/2 to 45/0 which gave much trouble and during a thunderstorm on 19th July 1930 breached at 23 places in a length of half a mile. It was found impossible to close these breaches. Attempt was therefore made to repair the Wahurwah bank and all breaches in it were successfully closed by 21st August 1930. These breaches caused a considerable amount of damage. The bund has now been repaired and strengthened. The Wahurwah bank in front of the Magsi Bund has been converted into a river bund and raised and strengthened.

In the Karachi Canals Division, the bund lines on the left and right banks of the river were exposed to heavy pressure but were successfully held intact. Owing to the eroding tendency of the river opposite (1) miles 3/5-34/6 of the Baghar Uchito Bund, (2) miles 0-1/4 of the Sonda Tarki Loop, (3) miles 16/6 to 17/7 of the Mulchand Shahbunder Bund, retired loops were considered necessary at these sites and these have now been constructed.

49. *Extensions and Improvements.*—A sum of Rs. 2,84,530 was spent under this head mainly on the following works :—

	Rs.
(1) Constructing the River Bund D. E. (from Taki 94 of the left bank new cut Begari to mile 0/6 of the 1896 Loop) slopes 3·1	28,344
(2) Replacing the pumping Engines along the Kashmore Bund	9,336
(3) Carrying out raising of the Right Bank Begari Bund.	1,590
(4) Raising and strengthening the old Kasimpur Bund.	70,542
(5) Extension of the Kasimpur Bund mile 5/2 to 17 of Koraiwah	6,074
(6) Raising and strengthening the Koraiwah Right Bank mile 17/0 to 11/6	
(7) Raising the Sukkur Begari Bund to a free board of 4′ above H. F. L. of 1929	4,422
(8) Raising the river bunds left bank to a free board of 4′ above H. F. L. of 1929	29,999
(9) Raising and strengthening the Adurtakio Loop mile 0/0 to 5/6 to a free board of 4′ above H. F. L. of 1929	39,777
(10) Raising and strengthening the Nara Bunds miles 27/0 to 39/5, 39/5 to 55 and 67/0 to 70 ..	38,369
(11) Converting the right bank of the Wahurwah into a river bund	15,011
(12) Raising and strengthening the Nara Bunds in the Dhamrao Sub-division	9,949
(13) Raising and strengthening the Nara Bunds in the Dadu Sub-division	1,494
(14) Constructing new double muharis along S. T. Loop and Sonda Hilaya Bund	3,794
(15) Constructing new double muharis along M. S. Bund and Kookawari Bund	5,346
(16) Extension of the Mitho Phulu Bund	3,196
(17) Raising and strengthening the Saidabad Jhalli Bund.	8,313

Maintenance and Repairs.—All bunds in the Circle were maintained at a cost of Rs. 9,58,628 including work establishment. Of this Rs. 1,20,305 were spent in the Begari Canals Division, Rs. 3,21,073 in the Shikarpur Canals Division, Rs. 42,676 in the Ghar Canals Division, Rs. 2,50,150 in the Western Nara Division and Rs. 2,24,424 in the Karachi Canals Division.

Irrigation and Financial Results.—The areas irrigated by canals ex: the Kashmore Bund and on Bunds in the Shikarpur Canals, Ghar Canals, Western Nara and Karachi Canals Divisions were 6,685, 8,672, 459, 48,313 and 11,034 acres respectively, while the revenue therefrom amounted to Rs. 11,589, 16,787, 434, 61,436 and 20,744.

General Remarks.—The remissions granted during the year amounted to Rs. 48,666 compared with Rs. 27,935 remitted last year.

50. *Expenditure and Receipts from gardens.*—The expenditure on and receipts from gardens during the year are compared below with the figures of the previous 3 years.

Year.	Expenditure on the maintenance of gardens during the year.	Receipts during the year.
	Rs.	Rs.
1927-28	8,506	1,192
1928-29	8,745	1,240
1929-30	7,057	524
1930-31	7,304	846

51. *Plantations.*—The total number of trees planted during the year was 20,416 of which 2,098 were talli, 7,572 babul and the rest were mostly nim. The total number of trees alive at the end of the year was 354,505.

3. INDUS LEFT BANK CIRCLE.

GENERAL REVIEW OF THE RESULTS OF THE YEAR 1930-31.

Area of cultivation, Government and Jagir.

52. The gross assessed areas for the year are given in the subjoined statement A.

Statement A.

Year and class of crops.	55—Construction of Irrigation, Navigation, Embankment and Drainage works not charged to Revenue. A—Irrigation Works.			15—Other revenue expenditure financed from ordinary revenues A—Irrigation Works, works for which neither capital nor revenue accounts are kept.	Grand total.
	Productive.	Unproductive.	Total.		
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Acres.	Acres.
Average for three years including 1929-30. Kharif.	668,199	608,871	1,277,070	13,147	1,290,217
Rabi..	118,705	75,189	193,894	4,045	197,939
Total ..	786,904	684,060	1,470,964	17,192	1,488,156

Statement A—contd.

Year and class of crops.		55—Construction of Irrigation, Navigation, Embankment and Drainage works not charged to Revenue. A—Irrigation Works.			15—Other revenue expenditure financed from ordinary revenues A—Irrigation Works, works for which neither capital nor revenue accounts are kept.	Grand total.
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Acres.	Acres.	Acres	Acres.	Acres.
1929-30	Kharif.	696,732	650,038	1,346,770	15,076	1,361,846
	Rabi..	95,081	94,365	189,446	8,548	197,994
	Total..	791,813	744,403	1,536,216	23,624	1,559,840
1930-31	Kharif.	637,870	596,083	1,233,953	13,593	1,247,546
	Rabi..	121,229	122,628	243,857	3,938	247,795
	Total..	759,099	718,711	1,477,810	17,531	1,495,341
Increase or decrease as compared with the average.	Kharif.	—30,329	—12,788	—43,117	446	—42,671
	Rabi..	2,524	47,439	49,963	—107	49,856
	Total..	—27,805	34,651	6,846	339	7,185
Increase or decrease as compared with 1929-30.	Kharif.	—58,862	—53,955	—112,817	—1,483	—114,300
	Rabi..	26,148	28,263	54,411	—4,610	49,801
	Total..	—32,714	—25,692	—58,406	—6,093	—64,499

The total cultivation shows an increase of 7,185 acres and a decrease of 64,499 acres when compared with the figures of the average of the last three years and with those of the last year respectively. The areas under kharif and rabi show a decrease of 114,300 acres and an increase of 49,801 acres respectively, as compared with the figures of last year and a decrease of 42,671 acres and an increase of 49,856 acres respectively when compared with those of the last triennium.

53. The area of dubari (twice cropped land) which is not included in statement A was 57,236 acres of which 8,308 acres were watered dubari in the Thar Parkar District. The dubari figures for the previous year

and the average figures for the previous three years were 111,985 acres and 63,574 acres while those of watered dubari were 22,681 acres and 11,877 acres respectively.

Irrigation assessment, Government and Jagir.

54. The net irrigation assessment for the year including "Hakabo" for Jagir lands is given in the subjoined statement B.

Statement B.

Year and class of crop.		55—Construction of Irrigation, Navigation, Embankment and Drainage Works not charged to Revenue. A—Irrigation Works.			15—Other revenue expenditure financed from ordinary Revenues A—Irrigation Works, works for which neither capital nor revenue accounts are kept.	Grand total.
		Productive.	Unproductive.	Total.		
1		2	3	4	5	6
		Rs.	Rs.	Rs.	Rs.	Rs.
Average of three years including 1929-30.	Kharif.	15,48,910	14,49,166	29,98,076	29,316	30,27,392
	Rabi..	2,40,116	2,46,804	4,86,920	13,240	5,00,160
	Total..	17,89,026	16,95,970	34,84,996	42,556	35,27,552
1929-30 ..	Kharif.	13,70,279	10,42,596	24,12,875	25,497	24,38,372
	Rabi..	2,19,793	3,64,705	5,84,498	28,902	6,13,400
	Total..	15,90,072	14,07,301	29,97,373	54,399	30,51,772
1930-31 ..	Kharif.	13,95,257	11,92,896	25,88,153	17,647	26,05,800
	Rabi..	1,93,189	2,71,445	4,64,634	8,409	4,73,043
	Total..	15,88,446	14,64,341	30,52,787	26,056	30,78,843
Increase or decrease compared with the average.	Kharif.	—1,53,653	—2,56,270	—4,09,923	—11,669	—4,21,592
	Rabi..	— 46,927	24,641	— 22,286	— 4,831	— 27,117
	Total..	—2,00,580	—2,31,629	—4,32,209	—16,500	—4,48,709
Increase or decrease as compared with the year 1929-30.	Kharif.	24,978	1,50,300	1,75,278	— 7,850	1,67,428
	Rabi..	—26,604	—93,260	—1,19,864	—20,493	—1,40,357
	Total..	—1,626	57,040	55,414	—28,343	27,071

The net assessed revenue shows an increase of Rs. 27,071 and a decrease of Rs. 4,48,709 as compared with that of the previous year and the average of the previous three years, respectively.

Cultivation on river spill.

55. The area cultivated on spill water was 3 acres, as compared with 13,396 acres of the previous year and 5,444 acres the average of the previous three years.

Assessment rates per acre on Government land.

56. The average net consolidated assessment per acre on Government land compared with that of the previous year and the average of the previous three years is shown below :—

	Average of previous three years.	1930-31.	1929-30.
	Rupees per acre.		
55—*Construction of Irrigation, Navigation, Embankment and Drainage works not charged to revenue.*			
1. Productive	2·49	2·29	2·21
2. Unproductive	2·56	2·07	1·94
15—*Other revenue expenditure financed from ordinary Revenues.*			
Works for which neither capital nor revenue accounts are kept	2·55	1·50	2·32
Average for all works	2·52	2·20	2·07

Actual realizations under all heads and the balance outstanding.

57. The following statement shows the realizations under all heads and the balance outstanding at the end of the year.

Statement C.

Years.	Collections.				Balance outstanding.
	Government land and Hakabo.	Miscellaneous.	Four per cent. irrigation share of proceeds from sale of occupancy rights.	Total receipts.	
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	Rs.
Average of past 3 years ..	31,03,975	1,28,870	1,59,714	33,92,559	2,87,009
1929-30	24,30,915	1,08,221	1,66,154	27,05,290	5,12,896
1930-31	23,86,491	81,125	1,68,201	26,35,817	9,49,453
Increase or decrease as compared with 1929-30.	— 44,424	— 27,096	2,047	— 69,473	4,36,557
Increase or decrease as compared with average of three years ..	— 7,17,484	— 47,745	8,487	— 7,56,742	6,62,444

The balance outstanding at end of the year viz., Rs. 9,49,453 is Rs. 4,36,557 more than that of the previous year and Rs. 6,62,444 more than the average of the previous three years respectively. The total outstanding balance at the end of the year on the Jamrao canal under both Government and Jagir was Rs. 3,34,474 against Rs. 2,27,776 at the end of the last year and Rs. 99,758 the average of the previous triennium.

Remissions on Government land.

58. The remissions granted during the year on Government land amounted to Rs. 14,27,978 against Rs. 15,54,621 remitted last year and Rs. 8,13,397, the average amount for the previous three years.

The following statement gives details of the causes of remissions and compares the results of the year under report with those of the previous year :—

Causes of remissions.	1929-30.	1930-31.	Difference.
	Rs.	Rs.	Rs.
Deficiency of water and drought	16,858	2,24,916	2,08,058
Breaches of Canals	3,17,320	60,091	— 2,57,229
Floods and erosion	6,84,345	917	— 6,83,428
Kalar soil	591	36	— 555
Grants cancelled and arrears	....	74	74
Locusts	1,84,870	2,379	— 1,82,491
Blights of Mahlo	21	11,672	11,651
Insects or wire worms	3,986	1,58,459	1,54,473
Written off	149	364	215
Frost	3,41,241	9,774	— 3,31,467
Rats	139	920	781
Special remissions	....	9,54,312	9,54,312
Other causes	5,101	4,064	— 1,037
Total ..	15,54,621	14,27,978	— 1,26,643

Remissions on Jagir lands.

59. The remissions granted during the year on Jagir lands amounted to Rs. 11,766. Out of the above sum, Rs. 11,017 were remitted in the Hyderabad Collectorate, Rs. 549 in the Thar Parkar Collectorate and Rs. 200 in the Nawabshah Collectorate.

Loss to Canals by Jagir lands.

60. The difference between hakabo or water rate assessed on the Jagir cultivation and the assessment at full rates on these areas is Rs. 2,61,537.

Expenditure on maintenance and repairs and establishment charged to Revenue.

61. The total charges during the year on account of maintenance and repairs amounted to Rs. 22,34,640 as shown below :—

	Rs.
Works	14,20,148
Establishment and Tools and Plant	6,64,681
Revenue collections	1,49,811
Total ..	22,34,640

The expenditure on establishment charged to works amounted to Rs. 3,84,830 while the net expenditure on " works " (clearance and repairs) was Rs. 10,35,318. As compared with the previous year and the average of the previous three years, the net expenditure on clearance and repairs shows a decrease of Rs. 2,09,067 and Rs. 40,825 respectively.

Expenditure on maintenance and repairs separately for canals and river embankments.

62. Of the total charges shown in the preceding paragraph, the amount spent on canals including the cost of surveys for special canal projects was Rs. 19,49,798, on the river embankments Rs. 2,36,262, and on the Indus River Gauging Division Rs. 48,580.

Outlay on New Works.

63. The outlay for the year on new works was :—

55-Construction of Irrigation, Navigation, Embankment and drainage works not charged to Revenue.

		Rs.
Productive ..	Capital	13,05,315
	Revenue	8,484
Unproductive	Capital	1,99,795
	Revenue	19,215

15-Other Revenue expenditure financed from ordinary Revenues, works for which neither capital nor revenue accounts are kept.

Revenue	2,53,311
Total ..	17,86,120

Regular establishment charges.

64. The regular establishment charges in respect of irrigation works amounted to Rs. 10,55,521 which is Rs. 1,31,481 more than the figure for the previous year and Rs. 1,99,433 more than the average of the previous three years.

Financial Results.

65. The general financial Results of all the irrigation works in this Circle are shown in the following statement :—

Statement D.

Class of works.	Gross Revenue.	Working expenses.	Net Revenue.	Simple interest.	Net profit, 1930-31.	Net profit, 1929-30.	Increase.	Decrease.
1	2	3	4	5	6	7	8	9
55-Construction of Irrigation, Navigation, Embankment and Drainage works not charged to Revenue.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. Productive ..	13,34,123	6,71,380	6,62,743	2,32,337	4,30,406	4,44,712	..	—14,306
2. Unproductive	12,81,834	12,79,182	2,652	8,38,095	— 8,35,443	— 11,32,494	2,97,051	..
Total ..	26,15,957	19,50,562	6,65,395	10,70,432	— 4,05,037	— 6,87,782	2,82,745	..
15-Other Revenue expenditure financed from ordinary revenue works for which neither capital nor revenue accounts are kept.								
3. Miscellaneous.	25,870	5,76,072	— 5,50,202	..	— 5,50,202	— 5,23,586	..	— 26,616
1930-31 ..	26,41,827	25,26,634	1,15,193	10,70,432	— 9,55,239	— 12,11,368	2,56,129	..
1929-30 ..	27,00,510	29,04,038	— 2,03,528	10,07,840	— 12,11,368	3,58,913	..	15,70,281
Increase or decrease.	—58,683	—3,77,404	3,18,721	62,592	2,56,129	— 15,70,281	..	..

66. The following statement shows the expenditure per acre of area irrigated under all classes of works excluding the cost of surveys for definite projects :—

Statement E.

Total area irrigated by all classes of works.	Total working expenses and maintenance of canals.	Rate of working expenses per acre of area irrigated. (Column 2 divided by column 1).	Expenditure on agricultural works for which neither capital nor revenue accounts are kept (excluding the cost of surveys for special projects).	Rate of expenditure on agricultural works for which neither capital nor revenue accounts are kept, per acre of area irrigated. (Column 4 divided by column 1).	Total working expenses per acre of area irrigated including expenditure on works for which neither capital nor revenue accounts are kept. (Column 3 *plus* 5).
1	2	3	4	5	6
Acres.	Rs.	Rs. per acre.	Rs.	Rs. per acre.	Rs. per acre.
1,495,341	19,50,562	1·30	5,76,072	·38	1·68

The total working expenses, including expenditure on works for which neither capital nor revenue accounts are kept amounted to Rs. 1·68 per acre of the total area irrigated, as compared with Rs. 1·86 per acre in the previous year and Rs. 1·92 the average rate during the past three years.

Length of Canals and Bunds.

67. There were 1270 miles of main canals and 3147 miles of branch canals (total 4417 miles) in operation during the year against the previous year's total mileage of 4451 miles (Main canals 1285 miles and branch canals 3166 miles).

The total length of river embankments is the same as last year viz., 421 miles.

Areas of principal crops. Government and Jagir.

68. The areas of principal crops grown during the year were :—

Statement F.

Crops.		1930-31. Lift.	1930-31. Flow.	1930-31. Total.	Average of previous three years.	1929-30.	Increase or decrease as compared with previous three years.	Increase or decrease as compared with 1929-30.
1		2	3	4	5	6	7	8
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Kharif	Rice ..	1,334	385,742	387,076	344,273	361,589	42,803	25,487
	Jowari ..	82,705	63,436	146,141	141,459	155,955	4,682	— 9,814
	Bajri ..	272,593	109,705	382,298	427,559	470,795	— 45,261	— 88,497
	Cotton ..	114,264	164,775	279,039	322,205	317,580	— 43,166	— 38,541
	Other crops	21,744	31,248	52,992	55,026	55,942	— 2,034	— 2,950
	Total ..	492,640	754,906	1,247,546	1,290,522	1,361,861	— 42,976	— 114,315
Rabi	Wheat ..	14,379	155,445	169,824	119,212	160,167	50,612	9,657
	Barley ..	114	2,792	2,906	3,663	2,917	— 757	—11
	Oilseeds ..	1,187	63,756	64,943	69,461	82,220	— 4,518	— 17,277
	Other crops	1,741	65,617	67,358	69,180	64,660	— 1,822	2,698
	Total ..	17,421	287,610	305,031	261,516	309,964	43,515	— 4,933
Grand Total ..		510,061	1,042,516	1,552,577	1,552,038	1,671,825	539	— 1,19,248

As compared with the last year and the average of the previous triennium, there is a decrease of 114,315 and 42,976 acres, respectively, under kharif and a decrease of 4,933 acres and an increase of 43,515 acres, respectively under rabi.

Percentages of Kharif and Rabi.

69. The percentages of kharif and rabi areas irrigated in the Circle were 80 and 20 against 81 and 19 of the last year. The highest kharif percentage was 82 obtained in the Hyderabad, Fuleli Canals and the Eastern Nara Divisions and the lowest percentage was obtained in the Jamrao Canal

Division, while the Nasrat Canals Division had 81 per cent. kharif during the year.

The Fuleli and Eastern Nara Divisions had, as usual, the largest rice areas viz. 274,085 and 71,028 acres respectively, out of the total rice cultivation of 387,076 acres for this Circle.

The largest areas under bajri were in the Hyderabad and Fuleli Canals Divisions viz., 136,696 and 71,258 acres respectively, the Eastern Nara, Nasrat and Jamrao Canal Divisions recording 68,236, 53,189 and 52,919 acres, respectively.

The largest area under jowari was, as usual, in the Nasrat Canal Division viz. 123,483 acres. The total area under cotton in the Circle was 279,039 acres, that on the Jamrao Canal and Eastern Nara, being 112,917 and 49,143 acres, respectively. The Hyderabad, Nasrat and Fuleli Canals Divisions had 60,593, 37,813 and 18,573 acres respectively.

The largest area of wheat was in the Jamrao Canal Division and amounted to 57,141 acres out of the total of 169,824 acres for the whole Circle, Fuleli Canals Division recording 32,131, Nasrat 29,783 and Eastern Nara 33,626 acres, respectively. The smallest area of wheat was in the Hyderabad Canals Division, viz. 17,143 acres.

The largest area under oilseeds was in the Nasrat Canals Division viz. 32,575 acres out of the total for the Circle of 64,943 acres, the Jamrao Canal Division recording the lowest, viz. 2,679 acres.

Out of the total area cultivated during the year 36 per cent. was watered by lift and 64 per cent. by flow against 37 and 63 per cent., respectively during the last year.

70. The duties and deltas of canals in this Circle show the usual fluctuations as shown in the subjoined statement :—

Name of Canal.	Year under report.		Last Year.		Remarks.
	Duty.	Delta.	Duty.	Delta.	
1	2	3	4	5	6
(i) *Nasrat Canals Division*					
Dad Canal including Ren Distributary.	44	5·0	63	8·2	The fall in duty is due to less cultivation and the fall in delta is due to canal stopping flow early owing to unfavourable set of the river.
Nasrat Canal ..	57	4·3	86	2·8	The fall in duty and rise in delta is due to less cultivation.
Naulakhi Canal ..	36	6·2	40	5·8	The fall in duty and rise in delta is due to canal stopping flow early.
Dambhro Canal ..	45	4·6	68	3·0	The fall in duty and rise in delta is due to less cultivation,
Mehrabwah ..	26	8·6	45	5·0	The fall in duty and rise in delta is due to less cultivation.

Name of Canal.	Year under report.		Last year.		Remarks.
	Duty.	Delta.	Duty.	Delta.	
1	2	3	4	5	6
(ii) Hyderabad Canals Division.					
Ali Bahar Kacheri ..	73	4·4	221	1·6	The fall in duty and rise in delta is due to less cultivation and abundant supply of water.
Great Marakh ..	62	5·5	154	2·0	Do.
Sarfrazwah ..	37	8·2	40	5·9	The fall in duty and rise in delta is due to better supply of water which was not utilized.
Gharo Muhammudo ..	86	3·3	93	2·5	The fall in duty and rise in delta is due to less cultivation.
Kari Shumali ..	30	15·9	55	5·6	Do.
Nasirwah ..	38	8·2	49	4·7	Do.
(iii) Fuleli Canals Division.					
Fuleli Canal—					
Kharif ..	44	8·0	62	4·9	The fall in duty and rise in delta is due to less cultivation.
Rabi ..	67	5·0	57	5·9	The rise in duty and fall in delta is due to economical use of water.
Hassanali Canal ..	25	11·0	63	4·9	The fall in duty and rise in delta is due to less cultivation.
(iv) Jamrao Canal Division.					
Jamrao Canal—					
Kharif ..	85	5·5	120	3·0	The fall in duty and rise in delta is due to less cultivation and better supply of water.
Rabi ..	94	2·6	92	3·3	The rise in duty and fall in delta is due to judicious use of water.
(v) Eastern Nara Division.					
Mithrao Canal—					
Kharif	55	6·0	110	3·0	The fall in duty and rise in delta is due to less cultivation and abundant supply of water which was not fully utilised.
Rabi	41	4·3	73	1·7	
Hiral Canal ..	82	4·0	126	2·6	The fall in duty and rise in delta is due to improved water supply which was not fully utilized.
Thar Canal ..	38	8·7	65	5·1	Do.
Khipro Canal ..	46	6·9	67	4·4	Do.

71. On " Productive Works " the incidence of working expenses on assessed revenue and per acre irrigated were 41·85 per cent. and Rs. 0·86 per acre, respectively, as compared with 52·55 per cent. and Rs. 1·01 per acre in the previous year, that on " Unproductive Works " being 84·32 per cent. and Rs. 1·74 per acre.

Incidence of working expenses.

72. The total value of crops grown in the irrigated area of 1,552,577 acres, as estimated by the Revenue authorities is Rs. 3,42,30,849 which gives an average rate of Rs. 22 per acre.

Value of each kind of crop irrigated.

B. DETAILS OF DIFFERENT WORKS OR GROUPS OF WORKS AND A COMPARISON OF AGRICULTURAL AND FINANCIAL RESULTS OF THE YEAR 1930-31 WITH THOSE OF THE PREVIOUS YEAR AND THE AVERAGE OF THE PREVIOUS THREE YEARS AND THE MAIN CAUSES OF ANY IMPORTANT DIFFERENCES IN THE RESULTS.

(*a*) Works for which capital accounts are kept.

(I) PRODUCTIVE.

ALIBAHAR KACHERI.

73. The canal flowed for 159 days during the year and worked very satisfactorily.

Capital. No expenditure was incurred on any works charged to Capital.

Extensions and Improvements. No expenditure was incurred during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 5,002 including the work-charged establishment.

Irrigation. The area irrigated during the year was 13,947 acres (kharif 11,367 acres and rabi 2,580 acres) against 18,752 acres (kharif 12,872 acres and rabi 5,880 acres) irrigated in the previous year and 14,615 acres (kharif 12,349 acres and rabi 2,266 acres) the average of the previous three years.

Financial Results. The gross revenue amounted to Rs. 20,321 against Rs. 28,383 in the last year and Rs. 28,795 the average of previous three years. Deducting working expenses, viz. Rs. 8,384 and the share due to old irrigation, viz. Rs. 8,239, the net revenue due to improvements was Rs. 3,698.

General Remarks. The sum remitted during the year was Rs. 6,612 against Rs. 8,387, remitted last year.

The principal crops grown were :—

Bajri	.. .. ..	7,849 acres
Cotton	.. .. ..	1,581 ,,
Wheat	.. .. ..	1,578 ,,
Oilseeds	.. .. ..	752 ,,

and the value of the whole outturn is estimated at Rs. 3,38,333 or Rs. 24 per acre.

Great Marakh System.

74. The canal worked very satisfactorily and was in flow for 170 days.

Capital. No expenditure was incurred on any capital works during the year under report.

Extensions and Improvements. No expenditure was incurred during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 54,009 including work-charged establishment.

Irrigation. The area irrigated during the year was 84,247 acres (kharif 67,857 acres and rabi 16,390 acres) against 99,130 acres (kharif 75,256 acres and rabi 23,874 acres) irrigated in the previous year and 84,328 acres (kharif 71,605 acres and rabi 12,723 acres) the average of the previous three years.

Financial Results. The gross revenue amounted to Rs. 1,55,317 against Rs. 1,09,475 in the last year and Rs. 1,66,428 the average of previous three years. Deducting working expenses, viz. Rs. 82,455 and the share due to old irrigation, viz. Rs. 36,032 the net revenue due to improvements was Rs. 36,830 against a loss of Rs. 6,647 last year.

General Remarks. The remission granted during the year amounted to Rs. 31,159 against Rs. 1,15,254 for the last year.

The principal crops grown were :—

Rice	..	..	13,745 acres
Bajri	..	..	35,120 ,,
Cotton	..	..	14,980 ,,
Wheat	..	..	2,383 ,,
Oilseeds	..	..	2,606 ,,
Other Crops	..	..	11,400 ,,

and the value of the whole outturn is estimated to Rs. 22,01,222 or Rs. 26 per acre.

Sarfraz System.

75. The canal flowed for 151 days and worked very satisfactorily.

Capital. No expenditure was incurred during the year under report.

Extensions and Improvements. No expenditure was incurred during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 20,009 including work-charged establishment.

Irrigation. The area irrigated during the year was 27,442 acres (kharif 24,791 acres and rabi 2,651 acres) against 27,894 acres (kharif 24,748 acres and rabi 3,146 acres) irrigated in the last year and 26,392 acres (kharif 23,642 acres and rabi 2,750 acres) the average of the previous three years.

Financial Results. The gross revenue amounted to Rs. 41,807 against Rs. 43,327 in the last year and Rs. 51,222 the average revenue of the previous three years. Deducting working expenses, viz. Rs. 29,468 and the share due to old irrigation, viz. Rs. 10,985, the net revenue due to improvements was Rs. 1,354 against a loss of Rs. 130 last year.

General Remarks. The sum remitted during the year was Rs. 9,169 against Rs. 11,315 remitted last year.

The principal crops grown were :—

Bajri	..	..	15,635 acres
Cotton	..	..	6,646 „
Wheat	..	..	1,211 „

and the value of the whole outturn was Rs. 6,34,323 or Rs. 23 per acre as estimated by the Revenue Authorities.

Gharo Mahmmudo System.

76. The canal worked very satisfactorily and was in flow for 140 days.

Capital. No expenditure was incurred on this head during the year under report.

Extensions and Improvements. No expenditure was incurred during the year under report.

Maintenance and Repairs. The canal and its branches were maintained at a cost of Rs. 47,395 including the work-charged establishment.

Irrigation. The area irrigated during the year was 78,651 acres (kharif 66,257 acres and rabi 12,394 acres) against 93,976 acres (kharif 72,867 acres and rabi 21,109 acres) irrigated in the last year.

Financial Results. The gross revenue amounted to Rs. 1,28,132 against Rs. 1,30,100 in the last year and Rs. 1,50,986 the average of the past triennium. Deducting working expenses, viz. Rs. 69,832 the net revenue comes to Rs. 58,300.

General Remarks. The sum remitted during the year was Rs. 27,685 against Rs. 41,836 for the last year.

The principal crops grown were :—

Bajri	..	..	..	41,850 acres
Cotton	..	..	..	18,641 ,,
Wheat	..	..	..	4,139 ,,
Oilseeds	..	..	..	2,697 ,,
Other crops		..	..	5,557 ,,

and the value of the whole outturn was Rs. 23,38,559 or Rs. 30 per acre as estimated by the Revenue Authorities.

Kari Shumali.

77. The canal was in flow for 239 days during the year and worked very satisfactorily.

Capital. No expenditure was incurred on any works charged to " capital ".

Extensions and Improvements. No expenditure was incurred on this head during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 24,497 including the work-charged establishment.

Irrigation. The area irrigated during the year was 37,837 acres (kharif 31,489 acres and rabi 6,348 acres) against 44,604 acres (kharif 37,082 acres and rabi 7,522 acres) of last year.

Financial Results. The gross revenue amounted to Rs. 55,799 against Rs. 59,844 in the last year and Rs. 72,111 the average of the previous three years. Deducting working expenses, viz. Rs. 35,383, the net revenue comes to Rs. 20,416.

General Remarks. The sum remitted during the year was Rs. 12,608 against Rs. 23,024 for the last year.

The principal crops grown were :—

Bajri	..	..	..	19,475 acres
Cotton	..	..	..	10,344 ,,
Wheat	..	..	..	3,531 ,,

and the value of the whole outturn was Rs. 11,49,176 or Rs. 30 per acre.

Nasirwah System.

78. The canal worked very satisfactorily and was in flow for 155 days.

Capital. No expenditure was incurred on any work charged to " capital ".

Extensions and Improvements. An expenditure of Rs. 70 was incurred on this head during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 23,983 including the work-charged establishment.

Irrigation. The area irrigated during the year was 32,428 acres (kharif 26,136 acres and rabi 6,292 acres) against 36,246 acres (kharif 28,971 acres and rabi 7,275 acres) irrigated during the last year.

Financial Results. The gross revenue amouted to Rs. 59,595 against Rs. 64,164 in the last year and Rs. 66,148 the average of the past triennium. Deducting working expenses, viz. Rs. 35,145, the net revenue comes to Rs. 24,450.

General Remarks. The sum remitted during the year was Rs. 12,939 against Rs. 14,398 for the last year.

The principal crops grown were :—

Bajri	..	..	..	16,029	acres
Cotton	..	..	..	8,395	,,
Wheat	..	..	..	2,786	,,

and the value of the whole out-turn was Rs. 10,77,381 or Rs. 33 per acre as estimated by the Revenue Authorities.

Fuleli Canal System.

79. The head of the New Fuleli is very favourable and it flows with 2 feet at Kotri and gets a very fair perennial supply. The canal worked satisfactorily owing to steady water level but there was practically no rain during the season. Rotations were therefore resorted to at the close of the season when there was deficiency of water supply. The maximum and average discharges were 9,142 cusecs and 8,766 cusecs respectively.

The canal was in flow for 183 days for kharif and 182 days for rabi.

Capital. The capital expenditure on the canal was Rs. 9,97,793 during the year.

Extensions and Improvements. A sum of Rs. 2,047 was spent on this head during the year under report.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 1,47,213 inclusive of work-charged establishment.

Irrigation. The area irrigated during the year was 4,13,580 acres (kharif 3,34,077 acres and rabi 79,503 acres) as compared with 417,487 acres (kharif 356,072 acres and rabi 61,415 acres) irrigated in the previous year and 436,908 acres (kharif 343,890 acres and rabi 93,018 acres), the average of previous triennium.

Financial Results. The gross revenue amounted to Rs. 7,21,656 against Rs. 7,99,146 in the previous year and Rs. 9,26,213 the average of the previous three years. Deducting Rs. 3,48,919 for working expenses and Rs. 1,28,188 for the share due to old irrigation, the net revenue due to improvements was Rs. 2,44,549.

General Remarks. The remission granted duing the year amounted to Rs. 3,26,276 against Rs. 2,80,470 remitted last year.

The principal crops grown were :—

Rice	246,561	acres
Bajri	58,675	,,
Cotton	17,827	,,
Wheat	30,847	,,
Oilseeds	30,112	,,
Other crops	16,975	,,

and the estimated value of the whole out-turn was Rs. 82,99,923 or Rs. 20 per acre.

Other canals in Fuleli Canals Division.

80. The canals in the Hyderabad and Guni Katiar Sub-Divisions worked well during the year under report.

Capital. No expenditure was incurred on this head during the year under report.

Extensions and Improvements. An expenditure of Rs. 1,593 was incurred during the year under report on this head.

Maintenance and Repairs. The canals and branches were maintained in good order at a cost of Rs. 21,700 including work-charged establishment.

Irrigation. The area irrigated during the year was 25,778 acres (kharif 22,249 acres and rabi 3,529 acres) against 31,842 acres (kharif 28,405 acres and rabi 3,437 acres) irrigated during the last year.

Financial Results. The gross revenue amounted to Rs. 38,062 as compared with Rs. 58,383 last year and Rs. 59,382 the average of the previous three years. Deducting working expenses, viz. Rs. 35,835, the net revenue was Rs. 2,227.

General Remarks. The remissions granted during the year amounted to Rs. 17,385 against Rs. 18,631 in the last year and Rs. 17,051, the average of the previous three years.

The principal crops grown were :—

Rice	13,111	acres
Bajri	7,914	,,
Wheat	1,236	,,

and the estimated value of the whole out-turn was Rs. 5,84,593 or Rs. 23 per acre.

Naulakhi Canal System.

81. The canal was in flow for 112 days and worked satisfactorily.

Capital. No expenditure was incurred on this head during the year under report.

Extensions and Improvements. An expenditure of Rs. 2,606 was incurred on this head during the year under report, on converting the Road Bridge at Darbello into a regulator.

Maintenance and Repairs. The canal and its branches were maintained in good order at a total cost of Rs. 48,999 including the work-charged establishment.

Irrigation. The area irrigated during the year was 63,172 acres (kharif 40,597 acres and rabi 22,575 acres) against 62,306 acres (kharif 47,052 acres and rabi 15,254 acres) in the previous year.

Financial Results. The gross revenue for the year amounted to Rs. 89,218 against Rs. 1,19,121 of the last year. Deducting working expenses, viz. Rs. 73,309, the net revenue was Rs. 15,909.

General Remarks. The remissions granted during the year amounted to Rs. 87,577 against Rs. 65,887 remitted last year.

The principal crops grown were :—

Rice	6,229	acres
Cotton	1,635	,,
Jowari	26,836	,,
Bajri	4,920	,,
Wheat	12,395	,,
Oilseeds	7,511	,,

and the estimated value of the whole out-turn was Rs. 14,34,500 or Rs. 23 per acre.

Dambhro Canal System.

82. The canal was opened on 1st June and ceased flowing on 12th September 1930. The head approach was heavily silted due to the eroding action of the river against its off-take and the canal had full supply level for 38 days.

Capital. No capital expenditure was incurred during the year under report.

Extensions and Improvements. No expenditure was incurred during the year under report on this head.

Maintenance and Repairs. The canal was maintained in good order at a total cost of Rs. 21,965 including the work-charged establishment.

Irrigation. The area irrigated during the year was 15,132 acres (kharif 13,050 acres and rabi 2,082 acres) against 16,108 acres (kharif 13,422 acres and rabi 2,686 acres) in the previous year.

Financial Results. The gross revenue amounted to Rs. 24,216 against Rs. 35,019 of the last year. Deducting working expenses, viz. Rs. 30,373 the net revenue during the year was *minus* Rs. 6,157.

General Remarks. The remissions granted during the year amounted to Rs. 17,714 against Rs. 10,712 in the last year.

The principal crops grown were :—

Jowari	..	..	10,188	acres
Bajri	..	..	1,517	,,
Wheat	..	..	1,285	,,

and the estimated value of the whole out-turn was Rs. 3,25,850 or Rs. 21 per acre.

(2) UNPRODUCTIVE.

Jamrao Canal.

83. The Jamrao canal and branches were maintained in good order The maximum and minimum discharges above the Nara weir were 10,484 cusecs on 19th August and 480 on 23rd January 1931 respectively. The rainfall during the year was scanty and was not helpful to the crops.

Capital. Expenditure to the extent of Rs. 72,395 was incurred during the year mainly on Improvements to Nara Supply Channel.

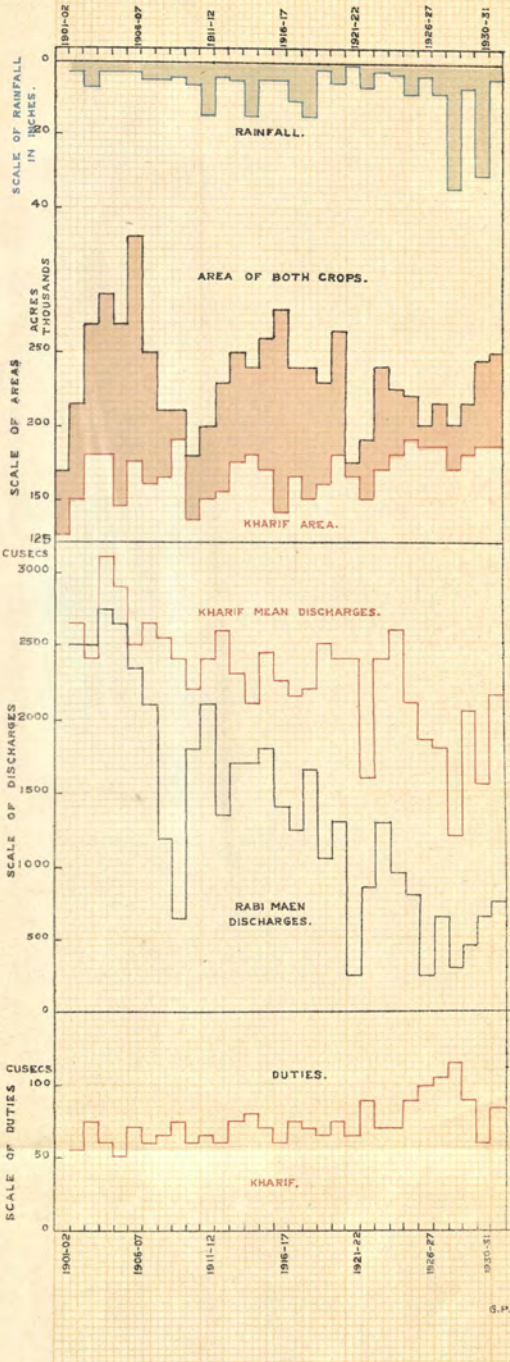
Extensions and Improvements. A sum of Rs. 7,127 was spent during the year under report.

Maintenance and Repairs. The canal and its minors were maintained in good order throughout the year at a cost of Rs. 2,31,424 including work-charged establishment.

Irrigation. The total area irrigated during the year was 2,52,184 acres (kharif 1,84,353 acres and rabi 67,831 acres) as compared with 2,44,778 acres (kharif 1,86,463 acres and rabi 58,315 acres) in the last year and 2,18,954 acres (kharif 1,80,036 acres and rabi 38,918 acres) the average cultivation of the previous three years.

Financial Results. The gross revenue of the year amounted to Rs. 4,92,552 as compared with Rs. 4,55,286 for the last year and Rs. 6,35,244 the average of the previous three years. Deducting working expenses, viz. Rs. 4,78,919 the net revenue during the year was Rs. 13,633.

General Remarks. The remissions granted during the year amounted to Rs. 3,85,408 against Rs. 3,42,649 in the last year.



JAMRAO CANAL

WORKING RECORD UP TO 1930-1931

NOTE:—

(1) The intercepts in the red area show the rabi area each year.

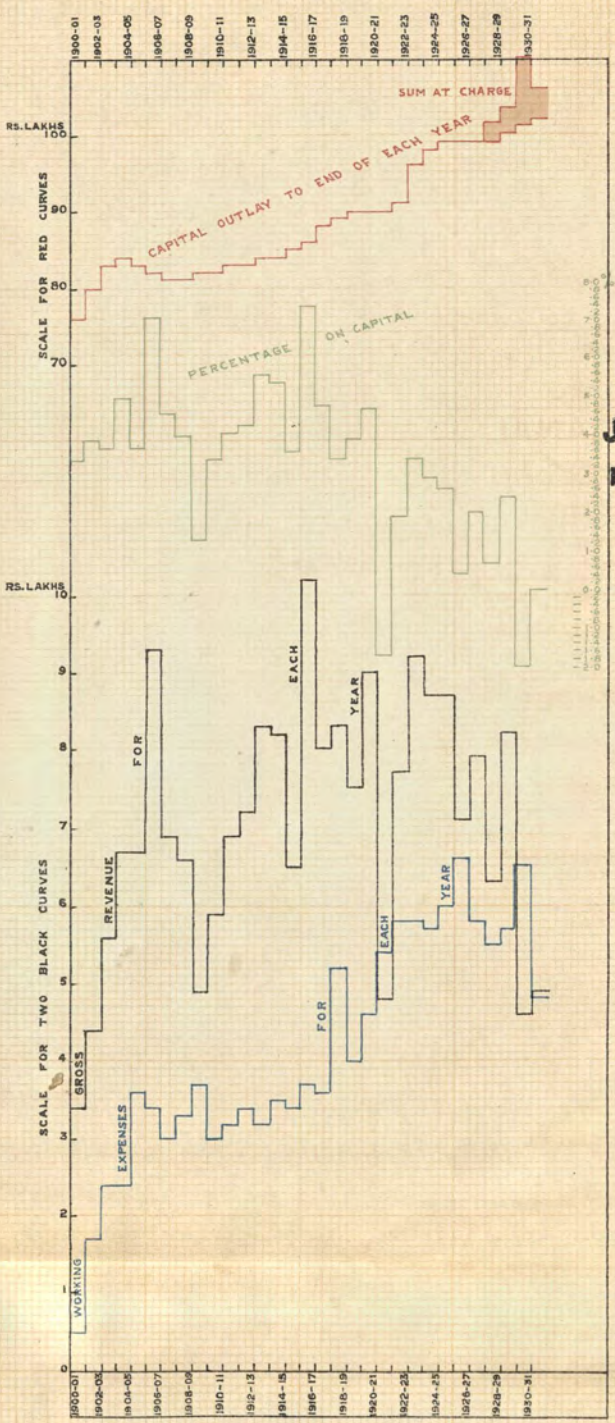
(2) The discharges are average discharges at head calculated on the total number of days of the season concerned.

(3) The duties are calculated on the above areas and discharges.

(4) The rainfall is average rainfall for all the stations on the canal.

(5) Low Kharif duty in 1930-31 is due to heavy remissions (50%) on account of floods. Corresponding rabi duty is high.

S.P.Z.O. Poona, 1932.



JAMRAO CANAL

FINANCIAL RECORD UP TO 1930-1931

NOTE:—

(1) The intercepts in the red area show arrears of interest unpaid up to end of each year, which being added to the capital give sum-at-charge.

(2) In 1920-21 and 1929-30 working expenses exceeded the gross revenue.

(3) Construction commenced in November 1849

(4) Canal was opened on 24th November 1899.

(5) General increase in working expenses after 1917-18 is mainly due to division of Jamrao Canal division into 2 executive charges.

(6) Fall in gross revenue in 1929-30 due to heavy remissions (50% year of flood) increase in working expenses in the same year due to extra expenditure in repairing damages due to floods.

(7) Appreciable fall in working expenses in 1930-31 due to economies in working

G.P.Z.D. POONA, 1932.

The principal crops grown were :—

Bajri	..	..	52,919	acres
Cotton	..	..	112,917	,,
Wheat	..	..	57,141	,,

and the value of the whole out-turn is estimated by the Revenue Authorities at Rs. 54,12,674 or Rs. 21 per acre.

Eastern Nara System.

84. The season under report commenced with an early rise in the river followed by a comparatively early fall. As compared to the last year the season was more satisfactory in that the river level was steadier. There were two breaches on the Mithrao. None of the breaches, however, caused any serious damage to life or property.

Capital. An expenditure of Rs. 80,837 was incurred on Improvements to the Nara Supply Channel.

Extensions and Improvements. No expenditure was incurred on this head during the year under report.

Maintenance and Reparis. All the Canals in the Division were maintained in good order at a cost of Rs. 2,11,015 including work-charged establishment.

Irrigation. The area irrigated during the year was 2,34,003 acres (kharif 1,92,870 acres and rabi 41,133 acres), as compared with 2,55,364 acres (kharif 2,09,068 acres and rabi 46,296 acres) in the last year and 2,29,791 acres (kharif 1,95,619 acres and rabi 34,172 acres) the average of the previous triennium.

Financial Results. The gross revenue amounted to Rs. 3,61,693 as compared with Rs. 2,45,094 for the last year and Rs. 4,15,085 the average of the previous triennium. Deducting Rs. 2,99,495 for working expenses and Rs. 3,100 for the share due to old irrigation, the net revenue due to improvements during the year was Rs. 59,098.

General Remarks. The remissions granted during the year amounted to Rs. 2,20,891 against Rs. 3,11,129 for the last year.

The principal crops grown were :—

Rice	..	..	71,028	acres
Bajri	..	..	68,236	,,
Cotton	..	..	49,143	,,
Wheat	..	..	33,626	,,

and the value of the whole out-turn is estimated at Rs. 41,27,986 or Rs. 18 per acre.

Dad Canal System.

85. The canal was opened on 23rd May and worked satisfactorily up to the end of August but owing to active river erosion near the off-take it ceased flowing on the 14th September 1930 causing damage to crops.

Capital. No expenditure was incurred on this head.

Extensions and Improvements. An expenditure of Rs. 1,410 was incurred on this head during the year.

Maintenance and Repairs. The canal and its branches (including Ren Distributary) were maintained in good order at a total cost of Rs. 1,50,584 including work-charged establishment.

Irrigation. The total area irrigated during the year was 1,18,441 acres (kharif 99,358 acres and rabi 19,083 acres) as compared with 1,41,723 acres (kharif 1,15,379 acres and rabi 26,344 acres) in the last year.

Financial Results. The gross revenue of the year amounted to Rs. 1,90,805 as compared with Rs. 2,34,279 of the previous year and Rs. 2,86,442 the average of the three previous years. Deducting working expenses, viz. Rs. 2,58,926 and the share due to old irrigation, viz. Rs. 38,699, the net revenue due to improvements was *minus* Rs. 1,06,820.

General Remarks. The remissions granted during the year amounted to Rs. 1,13,675 against Rs. 1,25,108 remitted in the last year.

The principal crops grown were :—

Rice	18,343	acres
Jowari	36,799	,,
Bajri	31,028	,,
Cotton	5,993	,,
Wheat	6,215	,,
Oilseeds	2,877	,,

and the estimated value of the whole out-turn was Rs. 27,89,786 or Rs. 24 per acre.

Nasrat Canals System.

86. The Lundi Head to the Nasrat canal worked very well this year too, though the Dhand feeding it was silting. It was flowing up to 2·7′ at Bukkur on 20th October 1930 although it was heavily damaged by the Khairpur spill water entering, crossing, and heading it up.

The Nasrat canal was opened on the 13th of April and ceased flowing on 20th October 1930. Notwithstanding the low river in the beginning of the season, the canal brought in a very good supply of water.

Capital. No expenditure was incurred on this head during the year under report.

An expenditure of Rs. 474 was incurred during the year under report on additions and alterations to the signallers' quarters and baulkshed at mile 16, Nasrat Canal.

Extensions and Improvements.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 1,18,873 including work-charged establishment.

Irrigation. The total area irrigated during the year was 1,15,606 acres (kharif 1,00,191 acres and rabi 15,415 acres) as compared with 1,33,313 acres (kharif 1,17,608 acres and rabi 15,705 acres) in the last year and 1,13,700 acres (kharif 1,02,902 acres and rabi 10,798 acres) the average cultivation of the past triennium.

Financial Results. The gross revenue of the year amounted to Rs. 2,00,030 as compared with Rs. 2,26,433 of the previous year and Rs. 2,64,505 the average of the previous three years. Deducting working expenses, viz. Rs. 2,04,125 and the share due to old irrigation, viz. Rs. 53,046 the net revenue during the year was *minus* Rs. 57,141.

General Remarks. The remissions granted during the year amounted to Rs. 1,32,062 against Rs. 1,63,875 remitted last year.

The principal crops grown were :—

Rice	..	..	1,222	acres
Jowari	..	..	40,517	,,
Bajri	..	..	12,589	,,
Cotton	..	..	31,154	,,
Wheat	..	..	7,465	,,
Oilseeds	..	..	5,831	,,

and the estimated value of the whole out-turn was Rs. 25,97,392 or Rs. 22 per acre.

Hassanali Canal System.

87. The Hassanali canal takes off from the Indus near Katiar and has a favourable head. The Full Supply Level was available for 74 days and there were no complaints of deficiency of water except in the extreme tail for the benefit of which rotations were enforced successfully.

Capital. No expenditure was incurred under this head during the year under report.

Extensions and Improvements. An expenditure of Rs. 1,361 was incurred during the year under report on this head.

Maintenance and Repairs. The canal and its branches were maintained in good order at a cost of Rs. 20,577 including work-charged establishment.

Irrigation. The area irrigated during the year was 21,076 acres (kharif 19,311 acres and rabi 1,765 acres) as compared with 22,362 acres (kharif 21,520 acres and rabi 842 acres) irrigated last year and 22,586 acres (kharif 20,567 acres and rabi 2,019 acres) the average of the previous three years.

Financial Results. The gross revenue during the year amounted to Rs. 36,754 as compared with Rs. 40,705 in the previous year and Rs. 44,638 the average of the previous three years. Deducting Rs. 39,730 for working expenses and Rs. 2,458 for the share due to old irrigation, the net revenue due to improvements was *minus* Rs. 5,434.

General Remarks. The remissions of the year amounted to Rs. 15,932 against Rs. 20,575 remitted last year.

The principal crops grown were :—

Rice	..	..	14,413	acres
Bajri	..	..	4,469	,,
Oilseeds	..	..	1,490	,,

and the estimated value of the whole out-turn was Rs. 4,96,188 or Rs. 23 per acre.

(b) Works for which Capital Accounts are not kept.

CANALS.

Nasrat Canal Division.

88. The principal canals under this classification are the Mehrab and other canals.

Extensions and Improvements. No expenditure was incurred on this head during the year under report.

Maintenance and Repairs. All the canals under this head were maintained in good order at a cost of Rs. 33,432 inclusive of work-charged establishment.

Irrigation. The total area irrigated on these canals during the year was 16,177 acres (kharif 12,693 acres and rabi 3,484 acres) as compared with 22,133 acres (kharif 13,776 acres and rabi 8,357 acres) irrigated during the previous year and 16,123 acres (kharif 12,061 acres and rabi 4,062 acres) the average of the past triennium.

Financial Results. The total canal revenue amounted to Rs. 19,478 and the maintenance and revenue collection charges were Rs. 33,432.

General Remarks. The remissions granted during the year amounted to Rs. 20,285 against Rs. 12,435 remitted last year.

The principal crops grown were :—

Jowari	..	..	9,143	acres.
Bajri	..	..	3,135	,,
Wheat	..	..	2,423	,,
Oilseeds	..	..	844	,,

and the estimated value of the whole out-turn was Rs. 3,48,078 or Rs. 22 per acre.

Hyderabad Canals Division.

89. The principal canals under this head are the old Ren and two or three very small canals.

Extensions and Improvements. No expenditure was incurred on this head during the year under report.

Maintenance and Repairs. All the canals were maintained in good order at a cost of Rs. 4,487 inclusive of work-charged establishment.

Irrigation. The total area irrigated was 2,876 acres (kharif 900 acres and rabi 1,976 acres) as compared with 3,807 acres (kharif 1,300 acres and rabi 2,507 acres) irrigated during the last year.

Financial Results. The total canal revenue amounted to Rs. 4,587 and maintenance and revenue collection charges were Rs. 4,487.

General Remarks. The remissions granted during the year amounted to Rs. 2,367 against Rs. 1,993 remitted in the previous year.

The principal crops grown were :—

Bajri	..	..	738	acres
Wheat	..	..	1,575	,,
Oilseeds	..	..	351	,,

and the estimated value of the whole outturn was Rs. 64,885 or Rs. 23 per acre.

Bunds.

90. All the bunds in this Circle stood the water pressure well and only a small breach occurred in the newly constructed portion of the Ren Bund in the Hyderabad Canals Division, but caused no damage.

Extensions and Improvements. A sum of Rs. 1,80,585 was spent on this head. Of this a sum of Rs. 4,000 was spent in Hyderabad Canals Division, Rs. 1,63,041 in the Nasrat Canals Division and Rs. 13,544 in the Fuleli Canals Division.

Maintenance and Repairs. All the bunds in the Circle were maintained in good order at a cost of Rs. 1,86,404 inclusive of work-charged establishment. Of this a sum of Rs. 2,501 was spent in Hyderabad Canals Division, Rs. 61,498 in the Nasrat Canals Division and Rs. 1,22,405 in the Fuleli Canals Division. Nothing was spent on special surveys in this Circle.

General Remarks. The total mileage of bunds in Hyderabad Canals Division is 5 miles, in Nasrat Canals Division 66 miles and in the Fuleli Canals Division 46 miles.

91. The figures of expenditure on and receipts from gardens during the year are compared below with those of the previous triennium :—

Expenditure on and receipts from gardens.

Years.	Expenditure on maintenance of gardens during the year.	Receipts during the year.
1927-28	9,939	1,914
1928-29	10,221	1,433
1929-30	9,842	702
1930-31	9,272	1,803

92. *Plantations.*—During the year about 29,929 new trees of various kinds other than babul were planted along canals and in gardens and nurseries, of which, 27,714 were alive at the end of the year. Besides these about 11,139 babul trees were also planted along canal banks and river embankments.

4. LLOYD BARRAGE AND CANALS CONSTRUCTION.

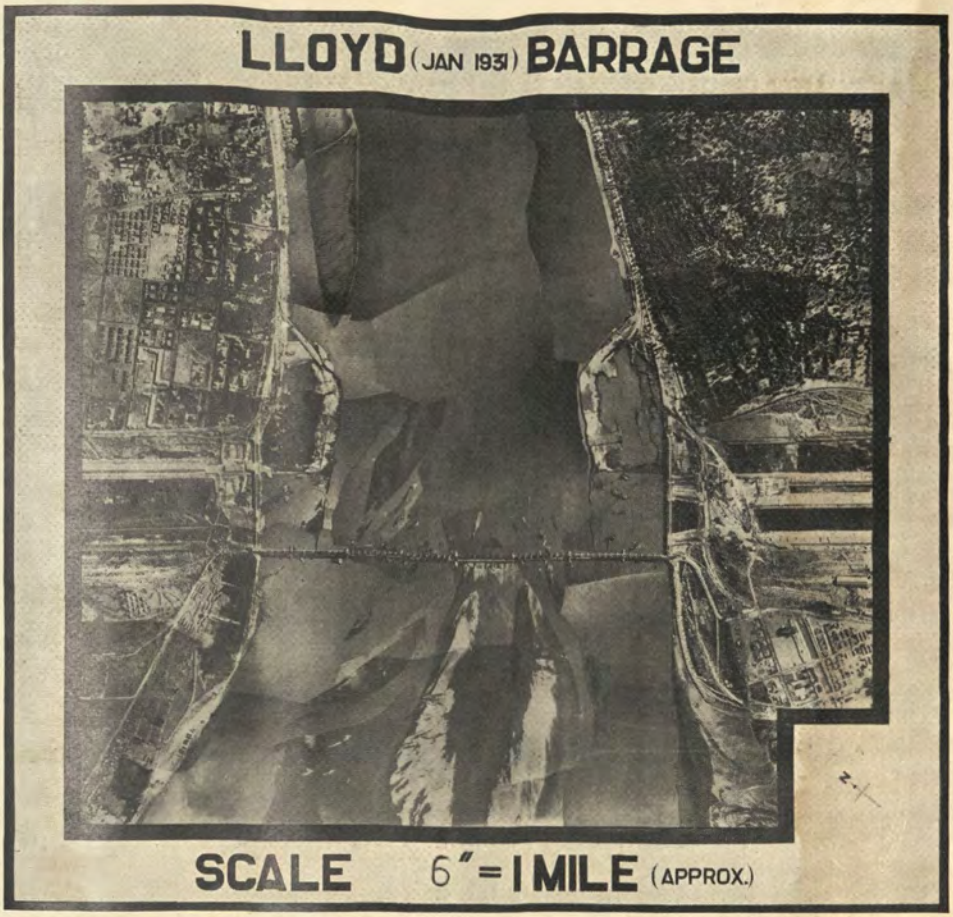
General Remarks.

93. The scheme consists of a Barrage or Weir across the river Indus, three miles below the gorge at Sukkur, with three canals on the Right Bank and four on the Left Bank taking off therefrom, each with a separate Head Regulator.

The year under report was the sixth full working year for the execution of the scheme. The heavy floods from the Khirtar Hills and the flood water from a serious breach in the Sukkur Begari Bund caused anxiety. These had an adverse effect on the progress of the works and the difficulties were further aggravated by very high sub-soil water levels. Everything possible was done to minimise the damage to the works and after the floods subsided every endeavour was made to make up for lost time.

94. *Progress on the Headworks.*—Before the abkalani, the underwater work of the 1929-30 season consisting of the remaining 27 spans of the Barrage was completed.

After the abkalani, when the level of the river had sufficiently fallen in September 1930, the construction of the cofferdams for the divide walls and approach channels on the right and left banks was commenced. The area covered by the cofferdam on the left bank was 52 acres and that on the right bank 45 acres. The former was completed by the middle of November and the latter by the end of October 1930. By the end of March 1931 the dredging for foundations in both the right and left bank cofferdams was completed and good progress was also made with excavation by hand, as also with pitching and superstructure masonry.



Aerial bird's eye view of Barrage, Canal Head Regulators, etc, taken in January 1931.

All under-water works of the Barrage Proper are completed. On either side of the Barrage are seen the completed Canal Head Regulators. Upstream of the Barrage and on both banks are seen the Cofferdams constructed for the two Divide Walls.

G. P. Z. P. 1932.

Aerial view of the Right Bank Cofferdam in the river taken in January 1931. Shows the Barrage and the right bank head regulators. The Cofferdam inside which the right bank divide wall is to be constructed is seen in the foreground.

G. P. Z. P. 1932.

Aerial view of the Left Bank Cofferdam in the river taken in January 1931.
Shows the Barrage and the left bank head regulators. The Cofferdam inside which the left bank divide wall is to be constructed is seen in the foreground.

The subjoined table gives the principal items of work done in the cofferdams.

	Right Bank.	Left Bank.
Excavation by dredger ..	42,00,000 cft.	54,15,000 cft.
Do. hand ..	43,10,000 „	50,36,000 „
Driving permanent piling ..	43,000 sft.	42,528 sft.
Cement concrete in foundation ..	53,000 cft.	45,645 cft.
Stone pitching	15,30,000 „	16,65,000 „
Superstructure masonry ..	1,16,000 „	1,06,000 „

Throughout the year under report, as far as the conditions of the river permitted, the main superstructure masonry of the Barrage and the Head Regulators, cutstone work and the work of constructing reinforced concrete arches were continued and good progress was made. The whole of the superstructure of the Barrage was practically completed with the exception of the parapets, two road bridge arches and two gate bridge arches in the middle of the Barrage, which were left to allow dredgers and other river craft to pass through. Good progress was also made with the erection of the barrage and regulator gates and counterweights.

Progress on Canals.

95. The Canal circles were occupied in surveys, preparation of working designs for distributaries, minors and for works in connection with the Manchar Drain, Flood Protective Bund and water-courses, the excavation of main canals, branches, distributaries and minors both by dragline machines and by manual labour, and the construction of masonry structures.

The total length of main canals, branches, escapes, distributaries and minors is 6,166 miles of which 4,500 miles were completed. The total quantity of earthwork done to end of March 1931 was about 487 crores cubic feet.

General Items.

96. The Research Division was engaged on making sub-soil investigations on both banks of the Indus. In addition, the Division was engaged on the designs of regulators and bridges and on carrying out experiments on the models of designs for regulators, Hume pipe culverts, syphons, etc.

97. The rectangulation survey of the area under the command of the canals of the scheme down to 320 acre rectangles was completed by the Survey of India. Further sub-division into 4-acre rectangles is being carried out by the staff under the Revenue Officer of the scheme.

98. During the year under report, the works were visited by His Excellency the Governor of Bombay, the Heir Apparent, Khairpur State, Sir George Rainy, Sir B. N. Sarma, the Secretary to Government, Public Works Department, Bombay, the Chief Commissioner, Railways, the Agent, North-Western Railway, the Consulting Engineer to the Government of India and the Lloyd Barrage Advisory Committee.

5. INDUS RIVER COMMISSION.

99. The expenditure on all works including surveys carried out under the direct supervision of the Chief Engineer in Sind during the year under report was charged to " 15-Other Revenue Expenditure financed from Ordinary Revenues—Works for which neither Capital nor Revenue Accounts are kept."

Survey of the Indus.

100. The main course of the river commencing at a point opposite Rojhan above Kashmor down to the bifurcation at the delta was surveyed and plotted.

Demarcation and Maintenance of District and State Boundaries.

101. Several works in connection with the demarcation of boundaries were carried out. A portion of the work in connection with surveying and marking the district boundaries, rails and pointers on the different deh maps in the Riverain area from Kashmor to Kotri was also completed.

Gauge Readings.

102. The daily gauge readings were taken along the river Indus at Mithankot, Doulatpur, Sukkur, Kotri, Mehrani, Hajipur, Jherruck, Charo and Chowgazo.

Discharge Observations.

Daily discharges of the Indus below the Mithankot confluence were observed at the following places :—

Serial No.	Name of site.	For measuring discharge of.	Situation.	Frequency of observations.
1	Sind ..	Indus above Mithankot confluence.	Near Daka village ..	Daily except for 1st June to 30th September.
2	Panjnad ..	River Panjnad above Mithankot confluence.	Do. ..	Daily except for 1st July to 19th September.
3	Mithankot ..	Indus ..	Near Mithankot town.	Daily except for 1st June to 13th September.
4	Sukkur ..	Do. ..	Near outfall gauge ..	Daily.
5	Kotri ..	Do. ..	1 mile below Railway Bridge.	Daily.
6	Jherruck ..	Do. ..	Near Tikhar village. i.e., Hajipur Gauge.	Daily.

Discharges were also observed at Nara, Khairpur, Chariowah and Jamshoro for the Eastern Nara Channel, Khairpur Canals, Manchur dhand and Fuleli Canal respectively.

103. The discharge observations at all the sites were made with the help of rack rod and pinion arrangement by which the accurate lowering of the meter to a particular depth has become very easy and quick. The work of taking discharge observations in the two provinces, Sind and the Punjab, is now done almost identically in respect of the methods of observation. The joint inspections made by the Executive Engineer, Indus River Gauging Division, and the Executive Engineer, Discharge Division, Lahore, have proved very useful for both the Provinces.

Scientific Works and Discharges of the Indus.

104. The discharge and other scientific observations were continued at Sukkur and Kotri as usual, the results of which will be published in "The Sind Discharge Data". The total monthly discharge at Sukkur during the inundation season and the maximum, minimum and average discharges of the year, compared with the results of the previous four years, are as follows :—

Month.	1926-27 Cusecs.	1927-28 Cusecs.	1928-29 Cusecs.	1929-30 Cusecs.	1930-31 Cusecs.
June*	5,010,000	4,120,000	9,170,000	5,720,000	7,460,000
July*	8,570,000	9,880,000	11,100,000	7,900,000	16,230,000
August*	14,890,000	14,550,000	10,350,000	15,340,000	13,470,000
September*	10,750,000	6,310,000	7,820,000	10,640,000	6,290,000
Total ..	39,220,000	34,860,000	38,440,000	39,600,000	43,450,000
Average discharge ..	321,000	286,000	315,000	325,000	356,000
Maximum discharge ..	607,000	625,000	477,000	702,000	657,000
Minimum discharge June to September ..	122,200	95,300	108,500	93,100	104,700
Minimum discharge observed throughout the year.	25,500	27,200	30,500	33,700	27,900

105. *Fleet.*—Necessary repairs to the engines of the S. L. "Madge" and "Hussaini" were carried out during the year under report and a few changes were made in the cabin of the S. L. "Hussaini" to make it more useful.

Engines of launches M. L. "Dorothy" and M. L. "Margaret" were repaired as found necessary.

*Totals of average daily discharges.

106. *Publications.*—With the introduction of the "Indus Bulletin" from 1st July 1930, the information now supplied is more complete. News about weather and rainfall affecting Sind are included in the Bulletin. During the abkalani, flood news was also published and this feature was greatly appreciated by all the readers of the Bulletin.

"The Sind Discharge Data" for 1928 have been printed. Data for 1929–30 are in hand.

The work of collecting *gauge readings and discharges of all the rivers in the Punjab* for all the previous years up to date is almost complete. Five typed copies of the data bound in volumes will be kept in important offices for ready reference; while an extract of important facts and figures will be included in the Indus River Commission Records, 1930–31.

"The Indus River Commission Records", 1926-30, have been printed. From 1930–31 these records will be published annually.

Work in connection with High Floods.

107. The flood of 1930 was not very high but was of long duration. The maximum reading at Bukkur was only 16·9 on 24th July 1930, but there were a number of breaches in river bunds.

Defects have been remedied as far as possible by taking the following measures :—

(*i*) All the breached portions of bunds and canal banks have been reconstructed, the weak portions strengthened and raised where necessary.

(*ii*) The Western Nara Bank from mile 4/3 to the head of the diversion and the right bank of the Wahurwah in front of the Magsi Bund have been converted into river bunds.

(*iii*) A sand trench has been provided in the Magsi Bund.

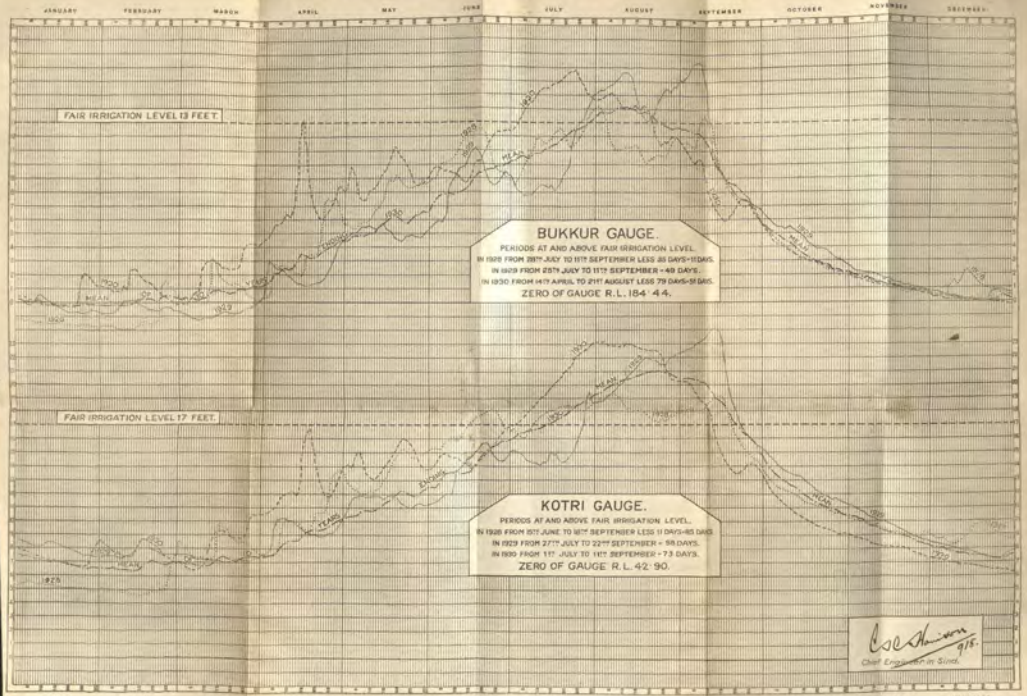
(*iv*) Protective bunds have been constructed where gaps previously occurred, so as to prevent the river spill flooding the interior at times of very high river levels.

Extensions and Improvements and Special Repairs.

108. The estimated cost of the works under these heads sanctioned or approved during the year 1930–31 by the Indus River Commission for execution by the Executive Engineers or by the Indus River Commission is as follows :—

Division.	Extensions and improvements.	Repairs.	Total.
Indus Right Bank Circle.	Rs.	Rs.	Rs.
Begari Canals Division	9,808	9,000	18,808
Shikarpur Canals Division	5,52,812	3,98,603	9,51,415
Ghar Canals Division	....	20,110	20,110
Western Nara Division	54,337	33,833	88,170
Karachi Canals Division	5,986	3,44,130	3,50,116
Total ..	6,22,943	8,05,676	14,28,619

HYDROGRAPHS OF THE RIVER INDUS AT BUKKUR & KOTRI.



Division.	Extensions and improvements.	Repairs.	Total.
	Rs.	Rs.	Rs.
Indus Left Bank Circle.			
Fuleli Canals Division	1,10,152	....	1,10,152
Nasrat Canals Division	3,25,190	1,48,602	4,73,792
Hyderabad Canals Division	14,665	....	14,665
Total ..	4,50,007	1,48,602	5,98,609
Indus River Gauging Division	1,187	926	2,113
Indus River Commission.			
Karachi Buildings Division for the work of making surveys on the Indus	8,500	....	8,500
Grand Total ..	10,82,637	9,55,204	20,37,841

WORKS UNDER THE DIRECT CONTROL OF THE INDUS RIVER COMMISSION.

109. The total expenditure incurred and accounted for was :—

	Rs.
Works	8,014
Repairs	48,061
	620
Tools and Plant	3,405
Grand Total ..	60,100

EROSION.

Shikarpur Canals Division.

110. The erosion opposite mile 26/3 to 28/2 of the Sukkur Begari Bund continued with the result that the bund at mile 26/5 was eroded on 21st June 1930. The Satabani Loop behind this point was constructed in 1929.

Nasrat Canals Division.

Heavy erosion started opposite ordinate 0/4 to 1/2 of the new Left Bank Embankment near Jatoi village and the bund between ordinates 0/4 and 0/5 was eroded on 24th May 1930. A new loop was constructed behind this portion of the embankment.

No. P. 196-B.

OFFICE OF THE COMMISSIONER IN SIND:

Government House, Karachi,
8th July 1932.

Subject :—Irrigation Administration Report, Part II—Sind—for 1930–31.

MEMORANDUM.

The Commissioner in Sind presents compliments and in continuation of his endorsement No. P-196-B, dated the 18th June 1932, on the subject noted above, has the honour to submit the following remarks together with a comparative statement showing the area irrigated and the assessment levied thereon in each of the three years ending 1930–31, and the average for the preceding three years ending 1929–30.

2. The season under report was not satisfactory on the whole. The river rose early this year and the Bukkur gauge reached 10·2 feet for the first time on the 17th June 1930. Thereafter it continued to rise steadily till it attained a maximum height of 16·9 feet at Bukkur on the 24th July 1930. The high rise of the river in the months of July and August 1930 caused floods in the country. As in the previous year, the river fell early, with the result that deficiency of water was felt in some canals and heavy remissions had to be granted on that account. The fair irrigating level of 13 feet on the Bukkur Gauge was first reached on the 3rd July 1930. This or higher level lasted for 50 days during the season as against 49 days in 1929, 11 days in 1928, 21 days in 1927, and 27 days the average of the previous three years. The fair irrigating level of 17 feet on the Kotri gauge was attained on the 1st July, and the river remained at this or a higher level for a period of 73 days as against 58 in 1929, 85 days in 1928, 47 days in 1927 and 63 days, the average of the last three years. The highest readings of the Bukkur and Kotri gauges this year were 16·9 and 23·1 respectively on the 24th and 30th July 1930 as against 17·7 and 24·1 feet on the 6th and 13th September 1929 and the maximum levels of 17·9 and 24·1 feet ever previously recorded on the two gauges.

Floods occurred in this as in the preceding year, causing widespread destruction of kharif crops, cattle, house and other property, especially in the Sukkur, Larkana and Nawabshah Districts. Breaches occurred in the river bunds and canal banks and large areas were submerged. A report on the inquiry into the causes of floods was submitted to Government separately by the Commissioner as President of the Indus River Commission under No. 18502-B, dated the 14th November 1930.

The rainfall was much below the average. The few showers that fell were beneficial to the crops, but were not adequate for the growth of fodder or for cultivation in Barani tracts, which suffered on that account.

In the province as a whole, there has been a decrease of about 3 per cent. both under cultivation on canals and assessment, from 33½ to 32½ lakhs of acres, and 109 to 106 lakhs of rupees, respectively.

3. The figures of cultivation for the two circles, as compared with the figures of 1929–30 and the average of the three years ending 1929–30, are given in the subjoined statement :—

	As compared with 1929-30.		As compared with the average of the 3 years ending 1929-30.	
	Kharif.	Rabi.	Kharif.	Rabi.
Indus Right Bank Circle	—89,000	+38,000	—20,000	+91,000
Indus Left Bank Circle	—114,000	+50,000	—43,000	+50,000

4. There was a total increase of 78,000 acres in the area under cultivation as compared with the average of the previous triennium.

5. Remissions of land revenue amounted to Rs. 32,66,000 as against 22,29,000 in the previous year and Rs. 13,60,000 the average of the three preceding years. Of the total remissions Rs. 7,90,000 were due to deficiency of water-supply ; Rs. 3,30,000 due to breaches of canals ; Rs. 2,29,000 due to floods and erosion, and Rs. 1,84,000 due to damage caused by rats, locusts and insects as against Rs. 82,000, 5,38,000, 8,60,000, and 3,31,000 respectively in the previous year. The other principal causes of remission were as under :—

	Rs.
(*a*) Frost and adverse winds	61,000
Against in the previous year	3,86,000
(*b*) Blights of Mahlo	24,000
Against in the previous year	5,000

Besides these, special remissions were granted on account of abnormal fall in prices, which amounted to more than 16 lakhs of rupees.

6. The outstanding balance of land revenue at the end of the year amounted to Rs. 16,41,000 (6,92,000 in the Right Bank Circle and Rs. 9,49,000 in the Left Bank Circle) as against Rs. 7,61,000 in the previous year and Rs. 5,07,000 the average of the last triennium. The increase is due to liberal suspensions having been granted on account of the fall in prices and economic depression.

7. The following statement gives details regarding the principal items of expenditure incurred on new works in connection with the several canals :—

Name of Canal.	Name of work.	Amount.
		Rs.
Kalri Canal	.. Remodelling the Kalri and Narichach canals.	2,25,000
Fuleli Canal System	.. Constructing a Cross Regulator over Shadiwah large, and remodelling and moduling Sani Guni, Mulchandwah, Ghar Kadhan, Dakiawah, Sherwah large, Shahwah, Alibahar Karo, Meharwah, Aliwah large, Manikwah Shadiwah large, Kaziawah, Fuleli Canal mile 70/3 to tail and constructing distributaries on the Fuleli Right and Left Banks and intermediate regulator at mile 70/3 of Fuleli Canal.	9,98,000
Jamrao Canal	.. Improvements to Nara Supply Channel, and on raising and strengthening banks.	80,000
Eastern Nara System	.. Improvements on the Nara Supply Channel	81,000

In addition to the above expenditure, a sum of Rs. 58,000 was spent for providing regulating gates to sluices along Nurwah, a branch of the Begari canal, and on surveys in connection with (1) the preparation of projects in the Begari Canal Division and (2) the improvements of Baghar Canal ; converting the road bridge at Darbelo on the Naulakhi Canal system into a regulator, constructing the proposed river bund D. E (from Taki No. 94 of the left bank new cut Begari to mile 0/6 of the 1896 loop) slope 3 : 1 ; constructing new double muharis along S. T. Loop and Sonda Hilaya loop ; constructing muharis along M. S. Bund and Kookawari Bund. A sum of Rs. 4,10,000 was moreover spent on raising and strengthening and extending the following bunds and the works connected therewith :—

(1) Right Bank Begari Bund.
(2) Kassimpur Bund.
(3) Sukkur Begari Bund.
(4) River bunds on the Left Bank.
(5) Adurtakio loop, mile 0/0 to 5/6.
(6) Nara Bunds, miles 27/0 to 39/5, 39/5 to 55, and 67/0 to 70.
(7) Right Bank of Wahurwah.
(8) Nara Bunds in the Dhamrao Subdivision.
(9) Nara Bunds in the Dadu Subdivision.
(10) Mitho Phulu Bund.
(11) Saidabad Jhalli Bund.
(12) Bunds in the Hyderabad, Nasrat and Fuleli Canals Division.

8. The subjoined statement shows the amount spent on maintenance and repairs in the year under report as compared with that spent in the previous year and the average of the three years ending 1929–30 :—

Circle.	1930-31.	1929-30.	Average of the three years ending 1929–30.
	Rs.	Rs.	Rs.
Indus Right Bank Circle	40,00,000	40,03,000	38,12,000
Indus Left Bank Circle	22,35,000	26,10,000	23,89,000

Out of this, the actual expenditure on clearance and repairs was as follows :—

	1930-31.	1929-30.	Average of the three years ending 1929-30.
	Rs.	Rs.	Rs.
Indus Right Bank Circle	26,09 000	24,80,000	23,31,000
Indus Left Bank Circle	10,35,000	12,44,000	10,76 000

R. E. GIBSON,
Commissioner in Sind.

To

The Secretary to Government, Public Works Department, Bombay.

The statement showing cultivated area and assessment of Government, Jagir and Foreign lands for the years 1928–29, 1929–30, 1930–31, together with the average of three years ending 1929–30.

(*Area in acres.*)

Year.	Indus Right Bank Circle.			Indus Left Bank Circle.			Total.		
	Kharif.	Rabi.	Total.	Kharif.	Rabi.	Total.	Kharif.	Rabi.	Total.
1928-29 ..	13,51,963	3,52,213	17,04,176	12,62,167	2,04,862	14,67,029	26,14,130	5,57,075	31,71,205
1929-30 ..	14,08,782	3,93,537	18,02,319	13,61,846	1,97,994	15,59,840	27,70,628	5,91,531	33,62,159
1930-31 ..	13,20,205	4,31,759	17,51,964	12,47,546	2,47,795	14,95,341	25,67,751	6,79,554	32,47,305
Average of 3 years ending 1929-30.	13,40,328	3,40,140	16,80,468	12,90,517	1,97,947	14,88,464	26,30,845	5,38,087	31,68,932

Assessment in rupees.

Year.	Total assessment in the Indus Right Bank Circle.	Total assessment in the Indus Left Bank Circle.	Total of the two Circles.
	Rs.	Rs.	Rs.
1928-29	60,90,348	43,16,268	1,04,06,616
1929-30	62,99,021	46,06,393	1,09,05,414
1930-31	61,17,478	45,06,776	1,06,24,254
Average of 3 years ending 1929-30 ..	59,71,647	43,40,949	1,03,12,596

Irrigation Administration Report, Sind, for the year 1930-31.

GOVERNMENT OF BOMBAY.

PUBLIC WORKS DEPARTMENT.

Resolution No. P. 22/16597.

Bombay Castle, 8th September 1932.

Letter from the Chief Engineer in Sind, No. S./I. R. 2, dated 30th September 1931.
Letter from the Chief Engineer in Sind, No. P. 62-W.(R), dated 28th May 1932.
Letter from the Joint Chief Engineer in Sind, No. P. 278-W.L., dated 13th June 1932.

Submit the Administration Report of the Indus River Commission, Administration Report of the Lloyd Barrage and Canals Scheme and the Administration Reports of irrigation works in the late Indus Right Bank and Indus Left Bank Circles, for the year 1930-31.

RESOLUTION.—The Indus rose early during the year under report but it again fell earlier than usual with the result that deficiency of water supply was felt in some canals. The high rise of the river in July and August 1930 caused floods, with consequent destruction of kharif crops, cattle, house and other property, especially so in the Sukkur, Larkana and Nawabshah Districts.

EXISTING IRRIGATION WORKS.

2. *Cultivation.*—The area irrigated during the year was 3,247,305 acres, a decrease of 114,854 acres from the figure for the previous year. This is exclusive of 465,581 acres of *dubari* or twice-cropped land.

3. *Financial Results.*—The following table compares the receipts and expenditure of the year with those of the previous three years on capital and non-capital irrigation works :—

Year.	Gross Revenue.	Working Expenses.	Net Revenue.
	Rs.	Rs.	Rs.
1927-28 ..	78,02,396	71,11,077	6,91,319
1928-29 ..	95,89,661	70,13,433	25,76,228
1929-30 ..	78,43,982	73,47,025	4,96,957
1930-31 ..	62,17,252	69,34,199	−7,16,947

The large fall in revenue was due to (1) the decrease in the area under cultivation, (2) ordinary but heavy remissions of land revenue granted during the year on account of deficiency of water, floods and breaches, and (3) the *special* remissions granted on account of the abnormal fall in prices of agricultural produce.

4. The capital invested in the existing works for which capital accounts are kept, up to the end of the year under review, was Rs. 4,67,33,591, made up as under :—

	Rs.
Productive	2,07,54,520
Unproductive	2,59,79,071
Total ..	4,67,33,591

The net receipts on capital works (exclusive of the share due to old irrigation) amounted to Rs. 6,05,558 which gives a return of 1·3 per cent. on the capital invested. The percentages of the previous three years were as under :—

1927–28	4·80
1928–29	7·68
1929–30	3·58

5. The rate of working expenses per acre irrigated was 2·13 as compared with 2·18 in the previous year.

6. The net consolidated assessment per acre on Government land in the Indus Right Bank Circle was Rs. 2·56 against Rs. 3·29 of the previous year. In the Indus Left Bank Circle it was Rs. 2·20 against Rs. 2·07 of the previous year.

7. The value of crops grown was Rs. 686 lakhs which shows a decrease of Rs. 120 lakhs as compared with the figure for the previous year.

LLOYD BARRAGE AND CANALS.

8. During the year under report the whole of the superstructure of the Barrage was practically completed, and out of 6,166 miles of main canals, branches and distributaries, 4,500 miles were completed.

By order of the Governor in Council,

T. A. ANDREW,

Deputy Secretary to Government,
Irrigation and Railways.

To

The Finance Department.
The Revenue Department.
The Commissioner in Sind.
The Commissioners of Divisions in the Presidency Proper.
The Chief Engineer in Sind.
The Joint Chief Engineer in Sind.
All Superintending Engineers of Circles.
The Revenue Officer, Lloyd Barrage and Canals Scheme.
The Director of Agriculture.
The Director of Information.
All Collectors in Sind including Deputy Commissioner, Upper Sind Frontier.
The Accountant General, Bombay.
The Audit Officer, Lloyd Barrage and Canals Construction.
All Executive Engineers of Divisions in charge of Irrigation Works in Sind.

BOMBAY : PRINTED AT THE GOVERNMENT CENTRAL PRESS.

INDEX MAP
OF
SIND
To accompany the Irrigation Administration Report
Part II, Sind.
1930-31.
Scale of Miles
REFERENCES
Canal District Boundries shown thus
Canals
Railway line
Bunds
Under construction
River gauges
Rain gauges
R.G
JACOBABAD
CANALS
SHIKARPUR
KHAIRPUR
CANALS
Shikarpur
Shahdadpur
Kandiaro
Nasirabad
SUKKUR
ROHRI
LARKANA
Mehar
Khairpur Nathechan
Nasirabad
Dadu
Mohi
Moro
Sehwan
Lohi
NARA CANALS
NAWAB SHAH
Sakrand
Manjhand
Shahdadpur
Matli
Tando Adam
Sinjhoro
Thano Bula Khan
KOTRI
HYDERABAD
Tando Alahyar
Tando Jam Khan
Sherpur
Tando Muhd. Khan
Hyderabad
Jamshoro
Digri
Tando Ghulam Ali
Tando Bago
KARACHI
Malir
Korangi
Mirpur Bathoro
Tatta
Mirpur Sakro
Shah Bandar
Jhungshahi
Allahbund
Keti Bandar
Mugalbin
Ladiun
CANALS
ARABIAN SEA
EASTERN NARA CANALS
Sanghar
Khipro
UMARKOT
Chachro
Mirpur Khas
Nagar Parkar
RANN OF CUTCH
CUTCH
CUTCH
RAJPUTANA
67° 0
68° 0
69° 0
70° 0
71° 0
26° 0
25° 0
24° 0

gitized with financial assistance from t
Government of Maharashtra
on 22 July, 2017

MAP OF SIND.

SHOWING
ALL AREAS TO BE IRRIGATED
BY
LLOYD BARRAGE AND NEW CANALS
AND
EXISTING CULTIVATION IN AREAS
NOT COMMANDED BY BARRAGE.

TO ACCOMPANY THE IRRIGATION ADMINISTRATION REPORT, PART II, 1919-20.

1919—20.

SCALE 10 MILES = 1 INCH.

REFERENCES.

British and State Boundary
Barrage Canals
Existing Canals Proposed to be Utilized
Barrage Irrigation Boundary
Existing Canals
Perennial Areas
Kharif do
Existing Areas not Commanded by Barrage

DETAILS OF CULTIVATION.—

PRE-BARRAGE ANNUAL ANNUAL CULTIVATION IN BARRAGE ZONE.

	ACRES.
British Territory	18,10,000
Khairpur State	Not known
Kalat	

FINAL ESTIMATED ANNUAL CULTIVATION IN BARRAGE ZONE.

	ACRES
British Territory	25,10,000
Khairpur State	3,00,000
Kalat	1,40,000
	29,50,000

PRESENT ANNUAL CULTIVATION FOR SIND CANALS OUTSIDE BARRAGE ZONE.

	ACRES.
British Territory	14,00,000
Kalat and Bahawalpur State	11,000